Lacking several issues

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Energy Ontario

TRANSPORTATION ENERGY NEWSLETTER

MTEAC

FEBRUARY, 1981

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES, AND THE PROVINCE OF ONTARIO

VOL. 1 NO. 1

Energy Supply and Consumption

Some facts about our energy situation:

Canada

* Security of crude oil supply is Canada's number one energy problem today. Canada cannot presently produce enough oil from domestic resources to meet its needs. At this time unfortunately, foreign supplies are increasingly expensive and their continued availability cannot be guaranteed.

* Canada today imports close to 25% of its crude oil supplies. By 1990, unless vigorous steps are taken, Canada will need to import about 40% of its requirements.

* Canada has an increasingly vulnerable oil supply, given its dependence on foreign crude oil and the prospect that world supplies could be cut off for political or other reasons.

Ontario

* Oil is Ontario's major source of energy. Yet, the province has very little of its own. Almost all of the oil comes from outside the province.

* Ontario's total energy demand is growing at the rate of 2.5% per year. While programs to conserve all forms of energy will continue, special emphasis is being placed on conserving petroleum which is not native to the province.

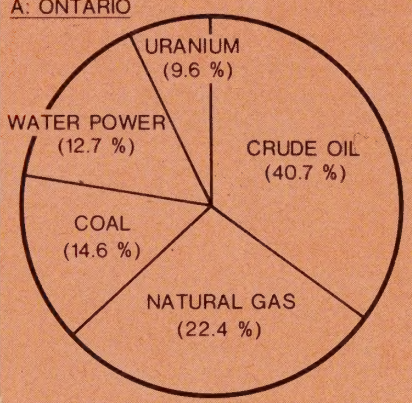
Transportation

* In Ontario, about 50% of total petroleum consumption occurs in the transportation sector with the major portion (35%) by private automobiles.

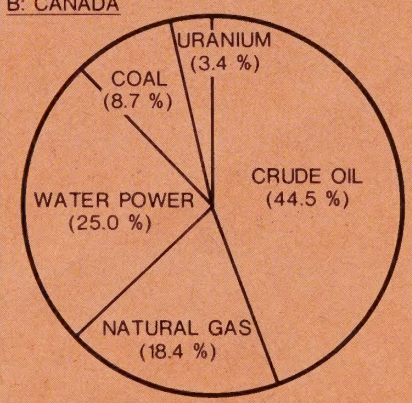
* The transportation sector is almost entirely dependent on crude oil. Thus the potential for successful conservation initiatives and development of alternative energy forms in this sector is great.

PRIMARY ENERGY CONSUMPTION
(1978)
COMPARISON

A: ONTARIO



B: CANADA



From: Ontario Energy Review, 1978

Energy Security for Ontario

Ontario policy is to contribute to achievement of the national goal of crude oil self-sufficiency for Canada by 1990.

Ontario's program to ensure energy security includes:

* energy conservation
* substitution of other fuels for oil
* increased production of indigenous forms of energy

Conservation is cost-effective today and is the key component of Ontario's energy security strategy. The conservation target for transportation is to achieve a 50% improvement in passenger transportation energy efficiency and a 20% improvement in freight transportation energy efficiency by 1995.

Substitution of fuels such as propane, compressed natural gas, power alcohols, electricity and hydrogen can lead to a major reduction in oil consumption.

Ontario has established a target to reduce the transportation sector's 100% dependence on crude oil for energy to 90% by 1995. In other words, by 1995, 10% of Ontario's transportation energy would come from alternative fuels.

MTEAC Newsletter

Welcome to the first edition of the Municipal Transportation Energy Advisory Committee Newsletter. It is being published quarterly to provide municipalities in Ontario with perspectives on the rapidly changing energy situation.

In this and future issues, the Newsletter will discuss ways in which the public and different levels of government can accommodate those changes, and measures which can be taken to achieve greater energy efficiency in transportation.

The Newsletter will also be used to report on studies and actions undertaken by individuals and public and private bodies throughout the province, the country and around the world.

By featuring articles of this kind, and by reporting on transportation technology and energy seminars, MTEAC hopes to keep municipalities informed of conservation programs in Ontario.

We would like to hear of programs implemented by communities of all sizes, from the smaller northern municipalities to the large regional ones. One of our aims is to develop a pool of information from Ontario sources from which ideas on transportation conservation techniques can be shared.

Transportation Energy Newsletter is a publication of the Municipal Transportation Energy Advisory Committee, a joint technical committee of the Ministry of Energy, the Ministry of Transportation and Communications, and Ontario Municipalities.

When you speed, you waste $$$ and gasoline.

What is MTEAC?

The Municipal Transportation Energy Advisory Committee was established to provide guidance, technical assistance and co-ordination to municipalities undertaking conservation studies. It can provide help with action program development, implementation and the monitoring of program performance.

MTEAC resulted from a Transportation Energy Seminar which the Ministry of Transportation and Communications and the Ministry of Energy sponsored in October, 1979. With 50 municipalities participating, a wide range of transportation energy issues were covered, stressing the importance of developing effective energy conservation programs and strategies for dealing with possible fuel shortages.

Discussion focused on the roles that should be played by both provincial and municipal governments in transportation energy conservation, and as a result, MTEAC was established. The members, representing different areas of the province and different disciplines, meet monthly. The committee is closely coordinated with the activities of the Joint Steering Committee on Energy Conservation.

Fuel Savers

More than three million litres (660 000 gallons) of fuel have been saved by the Ontario Ministry of Transportation and Communications in the operation of its fleet of vehicles in 1978/79, as a result of energy conservation measures introduced during the past five years.

A significant saving was accomplished by switching to smaller vehicles and using diesel engines in trucks and other maintenance equipment.

By replacing gasoline-powered snowplow trucks with five-ton diesel-powered vehicles, the ministry's net saving was 1 702 500 litres (378 500 gallons) of fuel last year alone.

In 1974, the ministry began substituting compact cars for full-sized vehicles, a change that resulted in a saving of 160 800 litres (35 400 gallons) of fuel last year. A total of 39,000 litres (8 600 gallons) was saved by the gradual replacement of gasoline-powered shoulder graders with diesel-powered machines, a change introduced in 1975.

The balance of the total estimated fuel saved – 1 150 000 litres (253 000 gallons) – is attributed to a decision to replace 3- and 4-tonne trucks with 5-tonne trucks. The larger trucks have about the same fuel consumption rate per km, but a much lower fuel consumption per tonne carried.

In addition to equipment changes, the ministry has also put together a fuel conservation program to be presented to all ministry operators in Ontario, which will teach fuel-saving driving techniques.

Going a step further, the ministry has also introduced TRUCKSAVE, a voluntary co-operative effort between the government and all segments of the trucking industry to reduce the amount of road fuel used in Ontario.

The trucking industry uses about a quarter of all road fuel in the province and the objective of TRUCKSAVE is to achieve a 20% saving in commercial road fuel consumption.

Measures adopted as part of TRUCKSAVE include improving adherence to posted speed limits and promoting the adoption of energy-conserving driving skills and practices.

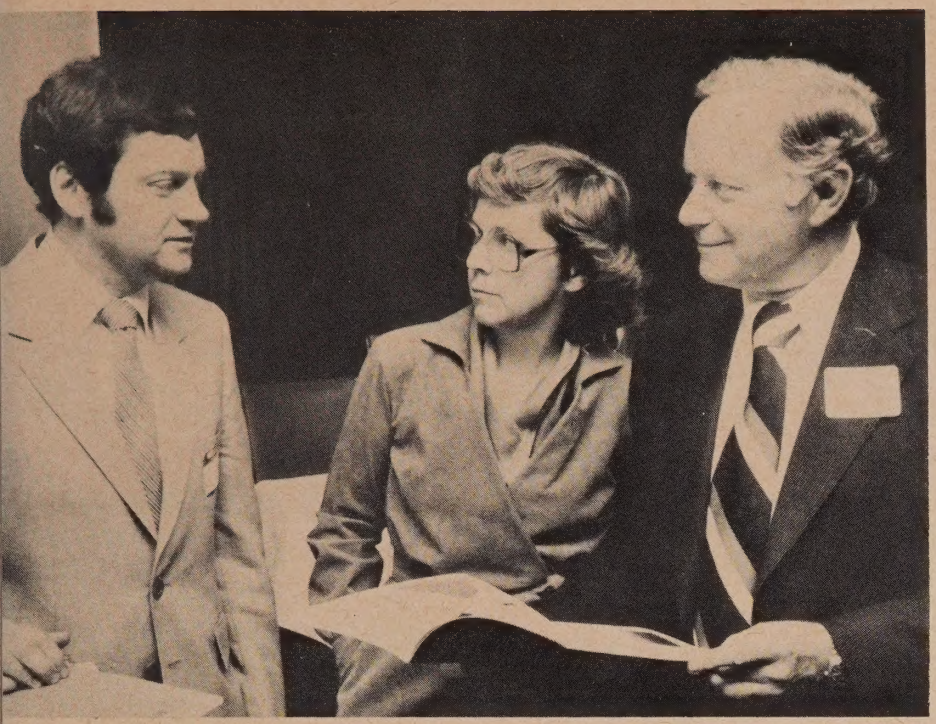
In the future, TRUCKSAVE expects to undertake demonstration projects on proven energy saving items and will test selected fuel-saving devices whose effects are not well known or are controversial.

Source: Ontario Business News

Toronto Transportation Energy Study underway

Due for completion in February of this year, the first phase of the Metropolitan Toronto Area Transportation Energy study (MTATES) is now in progress. The study has examined future energy scenarios, and has evolved a practical methodology for estimating the energy intensity of various passenger transportation modes.

Phase II, if undertaken, will concentrate on the development of comprehensive short and medium term implementation programs. These programs will consist of both incentives and disincentives aimed at reducing energy consumption in passenger transportation.



Cambridge Mayor Claudette Millar opened a Municipal Transportation Energy Seminar at the Cambridge Holiday Inn. With her is Jack McCorkell (left), Director of Operations for Durham Region and Chairman of the Municipal Transportation Advisory Committee, and Denis Dean, from the Ministry of Energy. (Cambridge Daily Reporter photograph by Rainer Leipscher.)

Radial tires for energy conservation

Radial tires offer great potential for energy conservation in terms of fuel consumption, tire wear, improved retreadability and reduced downtime. Radial plies eliminate shear stresses and lower rolling resistance resulting in lower power consumption, lower operating temperatures and lower spring rates. The difference is due to the purely radial direction of the body ply cords which perform the load carrying function as opposed to the diagonal criss-cross pattern of the conventional bias ply tire. The addition of belts to the carcass or body gives added stability to the tread and improved puncture protection.

Other advantages of radial tires:

* Longer wear, resulting from the more rigid construction which produces significantly less tread movement on the pavement. Tread life is 48% longer than the standard rib tire, and 10% longer than crossbar tires.

* Cooler running, resulting from reduced hysteresis loss and lower power consumption.

* Better impact penetration, resulting from the improved construction. Reduced cutting and puncturing reduces downtime 50–75% and improves the percentage of carcasses available for retreading.

* Equal or better traction due to reduced tread deflection.

* In most cases handling is improved, although some drivers dislike handling characteristics on gravel roads.

* Reduced shoulder tearing.

Many tests of the differences in fuel consumption caused by use of radial tires, have found an average 6% improvement in fuel consumption compared with the bias ply tire. In certain applications, such as buses, this improvement reached 12%.

The major disadvantage to the use of radial ply tires is cost. But while the initial outlay can be nearly 25% higher the increased initial and retread mileage can result in 37% increase in the value per truck due to radials. This is in addition to the 6% improvement in fuel consumption.

Source: Energy, Mines and Resources Canada

Did you know .....

Every $1 increase in a barrel of oil takes $100 million out of the Ontario economy for transportation-related uses alone, and each 1% saving of motor gasoline and diesel oil represents a $20–$30 million saving to the Ontario economy.

Regional Seminars

A series of nine seminars on energy conservation in the transportation sector was recently arranged by MTEAC. These took place at centres throughout Ontario and were well received by those taking part. The questionnaire distributed at the seminars provided some interesting feedback indicating specific aspects of transportation energy conservation which the participants felt should be more fully covered in future programs. The committee will arrange a return visit to any municipality on request.

Municipalities to install fuel saving traffic controls

Computerized traffic control systems are to be installed by the Regional Municipalities of Durham and Waterloo and the City of Brantford, in collaboration with the Ministry of Transportation and Communications, the Ministry of Energy and the federal government. The project, initiated by MTC, will get underway this year, and is expected to result in significant improvements both in on-street traffic operations and fuel savings.

Small Cars Save

Many companies encourage their employees to buy small cars, ride to work in vanpools or carpools, or use staggered hours to save fuel. But the company can also achieve additional energy savings when it is responsible for buying the cars used by its salesmen and other employees.

DuPont of Canada, for example, expects to save $30,000 per year in energy at today's prices by converting all the cars in its fleet from large to intermediate-sized cars. As of October, 1976, there were 220 cars in the fleet and by December, 1976, 44% were intermediate-sized. The expected savings are about $160/car/year at the current price of gasoline, and this figure does not take into account the lower maintenance charges for smaller cars.

There are many things a company can do to save energy in its car fleet – but purchasing smaller cars with smaller engines and cutting down on such gas-guzzling features as air conditioning are of prime importance.

From: Energy, Mines and Resources Canada

Conservation Programs

A number of programs and committees are presently working in the energy conservation field.

The Transportation Energy Management Program (TEMP) was established in June 1977 to reduce Ontario transportation's dependence on oil.

Energy Ontario is a new umbrella identification which represents the co-operative efforts of Ministries throughout the Ontario Government working for Ontario's Energy Security. The Energy Ontario sunburst trillium (shown on the front of this newsletter) allows instant public recognition of the 240 energy projects underway in 14 Ontario Ministries.

The Joint Steering Committee on Energy Conservation (JSC) is composed of members from the Ministry of Energy, Association of Counties and Regions of Ontario, Ontario Hydro and the Public Utility Commission. The JSC's activities include: designating Municipal Energy Coordinators, running seminars, distributing and updating their manual on energy conservation, and publishing a regular newsletter. These activities are all directed towards energy conservation in municipalities in all but the transportation sector. For further information contact Ms. B. Hume-Wright, 100 University Ave., Suite 1100, Toronto, Ont. M5J 1V6.

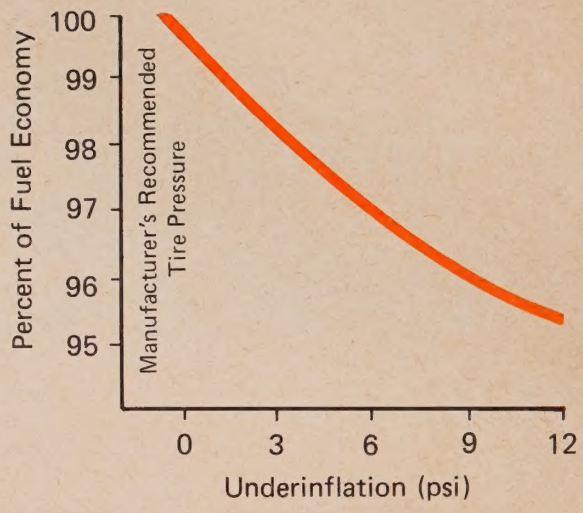
MTEAC operates within the Transportation Energy Management Program (TEMP) under the umbrella of Energy Ontario and is closely coordinated with the Joint Steering Committee on Energy Conservation.

Energy Facts

1 barrel of crude oil = 159 L
1 barrel of Alberta crude (10% for losses) = 143 L
Energy equivalent of 100 L of gasoline = 86 L diesel 135 L propane

TIPS

* A Canadian survey found that 60% of cars have hazardously underinflated tires.
* Tire pressure should be checked once a week, or at least once a month, for safety reasons and fuel economy.



* A drop of 10°C can reduce pressure by 2 psi.
* If tires are underinflated by 6 psi, 2.1 L of fuel will be wasted by the average car travelling 500 km.
* See Energy Ontario's "If We Each Save a Little We all Save a Lot," pamphlet for information on how to properly check and inflate your tires.

State-of-the-Art Manual

Most municipalities will soon be receiving MTEAC's State-of-the-Art Manual to guide and assist them in developing conservation opportunities in the transportation sector. The three-part manual, now being compiled, will consider the requirements of a cross-section of municipalities.

A wide range of topics will be discussed, including contingency planning, transportation systems management, fleets and infrastructure land use and case studies. MTEAC's role and its plan of action will be outlined as well. The format will be a flexible one to allow for future updating and additions.

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MTEAC

JUNE , 1981

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
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VOL. 1 NO.2

MTATES Report Now Released

Metropolitan Toronto Area Transportation Energy Study
SUMMARY REPORT

The Metropolitan Toronto Area Transportation Energy Study (MTATES) is a joint effort by Metro, TTC and MTC. The objectives of the first phase of this study were to establish a transportation energy data base and evaluation methodology and to determine the extent of the energy problem and its likely effects on transportation in Metropolitan Toronto.

The findings and conclusions are documented in a summary report. Three background reports reflect the topics of the study: (1) land use, transportation and energy relationships; (2) energy consumption and intensity of transportation modes; and (3) future energy scenarios.

Land Use and Energy

Land use is a major determinant of total travel demand through its influence on trip generation, trip length and frequency, modal choice, and modal energy efficiency. Increases in both residential and employment densities increase the attractiveness of substituting walking and bicycle trips for vehicle trips. MTATES notes that inhabitants of single-family detached homes are the greatest energy consumers in terms of both total consumption per unit and per person.

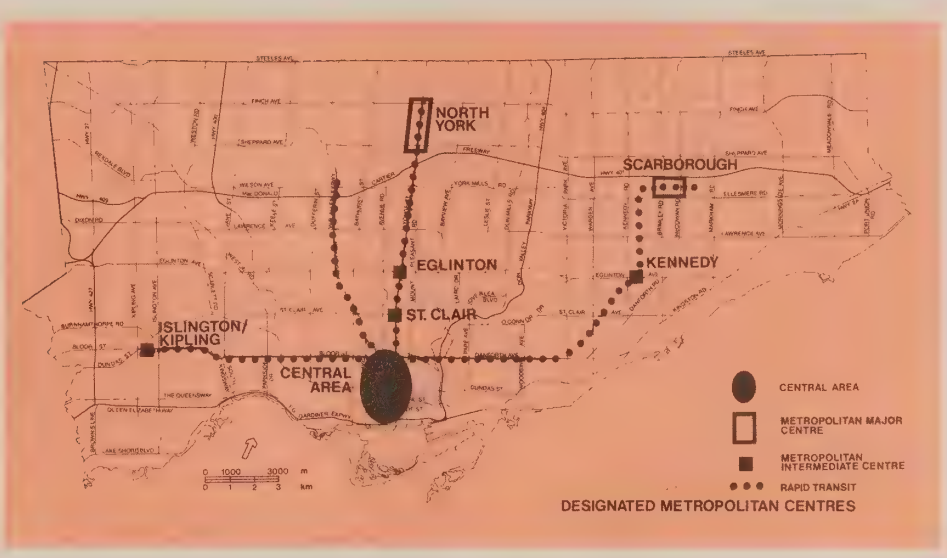
According to MTATES, a municipality can take advantage of energy conservation opportunities through site-plan reviews (eg. road and sewer) and involvement in the preparation of transportation plans. An energy-conserving transportation/land-use strategy should:

- increase residential densities (e.g., multi-family housing) in all parts of the region, which can increase the energy efficiency of transit service and support the formation of car and van pools;
- concentrate new urban development along major transit corridors and around suburban centres;
- integrate residential, commercial and industrial land uses through in-filling and multiple-use facilities;
- improve the balance, compatibility and relative location of residences and jobs in all parts of the metropolitan area to reduce the need for and distance of travel;
- encourage subdivision design and street layout which optimize the use of transit services and facilitate the substitution of walking and bicycle trips for vehicular trips.

Energy Consumption and Intensity of Transportation Modes

This background report outlines a methodology to assess the energy consumption of all major transportation modes under various operating conditions. The methodology takes into consideration the direct energy consumption (fuel used to propel vehicles) due to line-haul, access and circuity of routes, as well as the indirect energy consumption due to manufacture,

(See page 2)



The Official Plan of Metropolitan Toronto (1979) proposes a multi-centred urban structure oriented along rail rapid-transit facilities, thereby reinforcing transit travel patterns. The "central area" of the City of Toronto will maintain its pre-eminence as a regional focus, but a number of other "metropolitan centres" (2 major and 4 intermediate) have been designated to recognize existing and future employment concentrations along rapid-transit facilities.

Doug Thwaites

Chairman's Message

MTEAC has had a successful initial year under the chairmanship of Jack McCorkell of the Regional Municipality of Durham. The series of seminars conducted last spring provided valuable data and innovative methods of reducing energy costs in municipal transportation budgets. A summary of proceedings has been forwarded to all participants, and is available on request from MTEAC. A series of similar seminars/work sessions is being developed for the Autumn of 1981. More detailed information will be in the next newsletter.

The Drive Propane Demonstration Program, sponsored by TEMP, was fully subscribed by both municipalities and private-sector fleet operators. The program provides data to demonstrate the attractiveness of using propane.

Municipalities have been using propane to fuel ice-surfacing tractors in arenas for years. With this expertise now available, the use of propane in other municipal vehicles should be easily accommodated. Further information is available from TEMP.

The possibility of future energy shortages and the certainty of increasing costs make it mandatory for us to develop effective conservation and contingency plans now so that our services will not be disrupted in the future.

Energy Report .....

construction and maintenance of vehicles and transportation facilities. It can be used to compare the performance of various modes and to determine the energy impacts of implementing conservation measures in a given corridor or area.

Considering both direct and indirect energy consumption (not including access, non-revenue service, or circuity), and assuming that all seats are filled in the various modes, the trolley coach is the most efficient mode of travel in Metropolitan Toronto and automobile is the least efficient. Those findings are summarized in the accompanying chart.

It was further found that, compared to the total energy performance of a fully loaded twelve-passenger van, the average number of passengers required (for the full length of the comparable route) in the other modes would be: trolley bus 14, diesel bus 29, streetcar 30, subway 43, and commuter rail 141. Where the reverse (off-peak direction) flow on transit is light, these loadings would have to be increased by a factor of up to two for the full length of the compatible peak direction run.

Based on the reviews carried out, MTATES concludes that conservation – particularly in the transportation sector – offers the most immediate and cost-effective way in which Metropolitan Toronto can contribute to a reduction in petroleum consumption.

For example, a 10% increase in transit ridership (resulting from diversion from single-occupant automobiles) and a 10% increase in the (remaining) automobile occupancy would result in approximately a 16% reduction in transportation fuel consumption. Similarly, opportunities exist in optimizing road and transit operations.

MTATES found that the following four strategies are essential components of any effective conservation program:

1) increased efficiency in traffic flow and transit service;
2) diversion from single-occupant vehicles to high-occupancy vehicles;
3) reduction in travel (through consolidation of trips and substitution of travel by telephone calls);
4) vehicle and equipment improvements.

Phase II

The next step in developing an implementation program for conservation would be to select an energy saving package of complementary incentive/disincentive measures that would be most effective in each corridor or area. The intention now is to continue MTATES. Phase II will include the following three main components:

1) correlation of land use/transportation relationships with energy consumption in Metro Toronto;
2) development of an emergency preparedness plan for transportation for Metro Toronto to implement in times of petroleum shortages;
3) development of short and medium-to-long term programs for energy conservation in the transportation sector, including the development of a comprehensive monitoring program to measure the effect of implementing various conservation measures.

For more information contact: Mr. A.R. (Dick) Gordon, Manager, Transporation Section, Policy Development Division, Planning Department, Municipality of Metropolitan Toronto.

ENERGY INTENSITY BY MODE

MODE	ALL SEATS OCCUPIED			CRUSH LOAD		
	NO. OF SEATS	DIRECT ENERGY (MJ/seat-km)	TOTAL ENERGY (MJ/seat-km)	NO. OF PERSONS	DIRECT ENERGY (MJ/prs-km)	TOTAL ENERGY (MJ/prs-km)
AVERAGE CAR	5	1.24	1.55	5	1.24	1.55
VAN	12	0.63	0.75	12	0.63	0.75
DIESEL BUS(Urban)	40	0.50	0.54	100	0.20	0.22
TROLLEY COACH	40	0.23	0.26	100	0.09	0.11
SUBWAY	76	0.13	0.42	320	0.03	0.10
STREETCAR	52	0.22	0.43	130	0.08	0.17
COMMUTER RAIL	160	0.57	0.66	320	0.28	0.33

NOTE: For true modal comparisons real load factors must be used, and both access/egress and circuity of routing must be considered.

PROPANE

An Alternative Fuel For You?

Propane offers many advantages as a transportation fuel. While Canada does not produce enough crude oil to meet its current needs and must import more than 20% of its crude oil supplies, it does have a surplus of domestically produced propane. Thus, the use of propane as a transportation fuel could help reduce our dependence on imported fuel.

In April, 1980, the province announced two new and important incentives for conversion to propane:

1/ the removal of the 4.6¢/L road tax from propane and other alternative fuels; and
2/ a retail sales tax exemption on purchases of new or used vehicles that are set up to run exclusively on propane.

The federal government also offers a financial incentive for propane conversion. Under the National Energy Program released in October, 1980 commercial fleets receive taxable grants of up to $400 for each vehicle converted exclusively to propane.

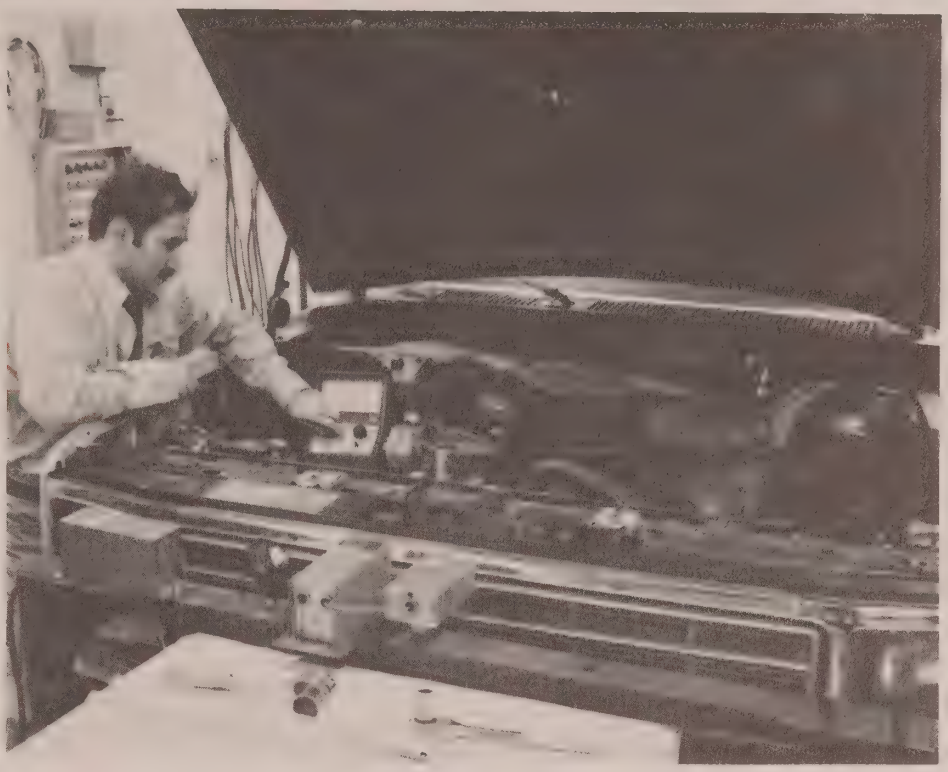
The net value of these incentives is substantial. A new vehicle costing $10,000 and converted to propane at the time of purchase would generate provincial tax savings of $2815 and federal tax savings of $350 over five years if it travelled 240 000 km (150,000 miles) with an average fuel economy of 28 L/100 km.

Propane is currently about 8.8¢/L cheaper than gasoline when purchased wholesale by a commercial fleet operator. This difference includes the 4.6¢/L resulting from elimination of the provincial road tax. If we take the case of a commercial vehicle travelling 51 000 km (30,000 miles) per year at an average of 28 L/100 km (10 miles per gallon) and thus consuming 13 650 L (3,000 gallons) of gasoline per year, its annual gasoline bill at current prices would be $3,600. When converted to propane this vehicle might experience a 10% reduction in fuel economy (i.e., 15 000 L of propane for the sample vehicle).However, given that propane is considerably less expensive, annual cost for the propane fuel required would be about $2,640. This is a saving of $960 over gasoline. The elimination of the 4.6¢/L road tax accounts for $630 of this saving. Combining the tax savings with the fuel cost and maintenance savings, the present value of a fleet operator's savings on propane over five years would be about $4,700. (See chart.)

FIVE-YEAR SAVINGS

Provincial Sales Tax: $10,000 x 7%	= $ 700
Fuel Cost Savings (Including Road Tax Savings): $960/yr	= 3220
Maintenance Cost Savings: $150/yr	= 500
Federal Grant (Assuming 20.5% Tax Rate): $400	= 350
Present Value of Total Savings over 5 years	= $4770

Note: Discount rate assumed throughout.



A clean-burning fuel, propane reduces maintenance costs and increases engine life. It leaves no lead, varnish, or carbon deposits to foul piston rings or spark plugs, or to contaminate lubricating oil. The cost of converting a vehicle is about $1500.

Drive Propane Program

In order to provide fleet operators with knowledge and information about propane as as a transportation fuel, the Ontario government in July 1980 established the Drive Propane Demonstration Program. Drive Propane has three primary objectives:

1/ to obtain information on the performance of propane vehicles in commercial fleets in Ontario;
2/ to inform fleet operators throughout the province of the results of the demonstration program;
3/ to work with manufacturers, suppliers, and regulatory agencies to ensure the necessary support for more widespread use of propane.

Some 290 propane-powered vehicles (plus gasoline control vehicles) from private-sector and government fleets are participating in Drive Propane. The fleets are based in many parts of Ontario and operate a wide variety of vehicles in many different applications. They include national, regional, and local fleet operators, as well as the government fleets of the Ministries of Natural Resources and Transportation and Communications, the City of Sudbury, and the Niagara Regional Police.

Further information on Drive Propane is available from: Mr. T.G. Robbins, Manager of Marketing, TEMP, 3rd Floor, Central Building, 1201 Wilson Avenue, Downsview, Ontario, M3M 1J8, Tel: (416) 248-7296

Editor's Note: These provincial tax savings were calculated using a fuel tax saving of 4.6¢/L; the May 1981 budget, which changed the fuel tax to a 20% charge will substantially enhance the financial benefits of propane. The savings are now: regular – 5.4¢/L; unleaded – 5.8¢/L; premium – 6.0¢/L. Also, kits used to convert gasoline powered vehicles to alternative fuels are now tax-free.

MUNICIPAL ACTIVITIES

Energy News From Hamilton–Wentworth

The Region of Hamilton-Wentworth is currently undertaking a Transportation Energy Management Study. The purpose of the study is to determine the energy savings and costs of relatively inexpensive transportation system management measures, and to develop short and medium term implementation programs. These programs are expected to include some traffic operations, transit and regulatory measures, and general measures such as staggered hours and educational programs. The study is funded by TEMP and should be completed in the fall of 1981.

Hamilton is also involved in the Drive Propane Demonstration Program. Twenty police vehicles in Hamilton are involved in the program; 10 propane vehicles and 10 control vehicles.

Municipal Traffic Control

The Municipal Traffic Control Signal Projects use a central computer to coordinate all of the traffic signals in a municipality. Three projects are now underway in Brantford and the regional municipalities of Durham and Waterloo. The contract for these projects was awarded to Canadian General Electric in February, 1980. All three projects were funded as a special energy demonstration by the Ministry of Transportation and Communications, the Ministry of Energy, and Energy, Mines and Resources, Canada, and are scheduled for completion in February, 1982. A number of other municipalities are considering the installation of computerized traffic control systems. These include London, Mississauga, Thunder Bay and Windsor.

Municipal Transportation Energy Survey

This survey of transportation energy conservation activities of Ontario municipalities is being commissioned by MTEAC. A team from the faculty of Environmental Studies, York University, will conduct the survey.

The survey will provide a benchmark against which to evaluate MTEAC's current and future programs. Questionniares are being sent to all cities and boroughs, towns and townships of 5000 population or over, Regional Municipalities, District Municipalities, counties, and any other municipalities with an appointed energy co-ordinator.

The survey's final report will be completed by the end of July, and a summary of the findings will be reported in the next MTEAC Newsletter.

TEAM

The Transportation Energy Analysis Manual (TEAM) will be a guide for municipal decision-makers and transportation professionals describing actions which can effectively reduce energy consumption within their municipalities.

The manual will include state-of-the-art information on transit measures, roadway-system improvements, ride-sharing, bicycle and pedestrian facilities, fleet management, road construction and maintenance. It will offer suggestions on managing energy-conservation programs, and document a methodology for energy analysis.

The manual is now in the final stage of preparation, and each of its chapters will be published as it becomes available.

Energy News

High Occupancy Vehicles

The Preferential Treatment for High Occupancy Vehicles (HOV) study was commissioned by the Ontario government to determine which HOV priority treatments would be best implemented in Ontario. The study is also examining where priority treatments should be applied and what guidelines should be followed in their application. The report should be available this summer, and additional information will be provided in the next newsletter.

5th INTERNATIONAL CONFERENCE ON TRAVEL BEHAVIOUR

When? -- June 20-25, 1982
Where? -- Saratoga Springs, N.Y.

The focus of this conference will be on the interrelationship between transportation research and practice with respect to travel behaviour. Particular emphasis will be on the changes in household travel patterns that are emerging due to fuel price increases, changes in demographics and economic factors.

In order to plan this conference to meet your needs, we would like to hear from you. Please send your suggestions for seminar workshop topics or proposals for specific papers to:

Mr. Jouko Parviainen, Manager
Municipal and Intercity
Transportation/TEMP
1201 Wilson Avenue, MTC
Downsview, Ontario
M3M 1J8

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Ontario
Ministry of Transportation and Communications
Hon. James W. Snow, Minister
Ministry of Energy
Hon. Robert Welch, Minister

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Energy Ontario

TRANSPORTATION ENERGY NEWSLETTER

MTEAC

December, 1981

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES, AND THE PROVINCE OF ONTARIO

VOL. 1 NO. 3

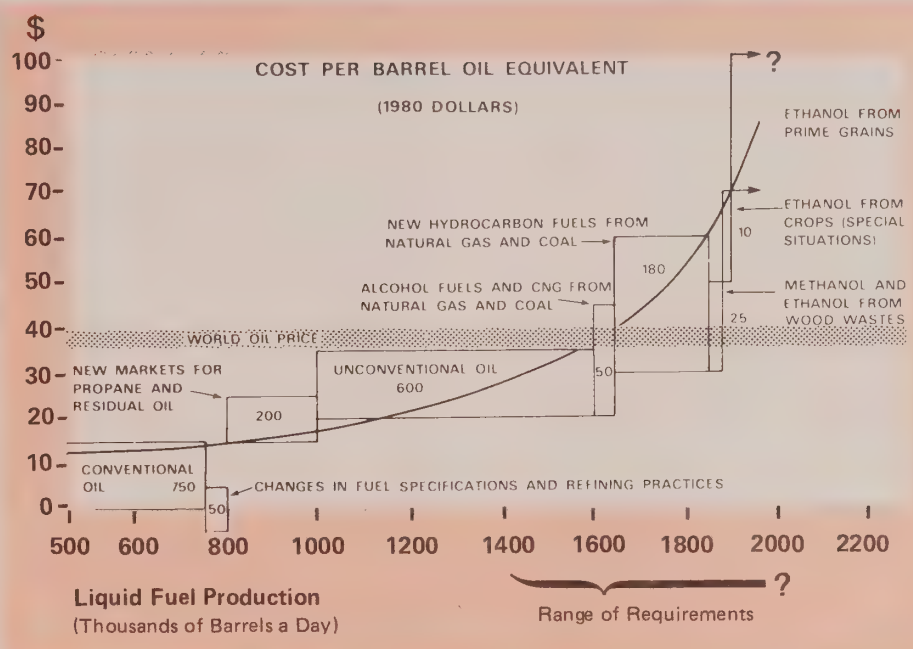
Alternative Fuels

The Ontario Government's Alternative Fuels Policy has set a target of reducing Ontario's almost total dependence on oil-based transportation fuels 2% by 1985, and 10% by 1995.

In order to reach these goals Ontario's vehicles will have to use greater quantities of alternative fuels. Eight possible alternatives to gasoline have been identified: diesel fuel, propane, natural gas (methane), ethanol (ethyl alcohol), methanol (methyl alcohol), synthetic hydrocarbons, hydrogen and electricity.

A few of these are available right now, some may become available in the near future, while others may become practical only in ten or twenty years time.

Canadian Liquid Fuel Options for 1990



Source. Energy, Mines and Resources, Discussion Paper on Liquid Fuel Options 1980

Diesel Fuel

Diesel fuel, being oil-based, cannot contribute to the above-mentioned goals. It is, however, an energy conserving alternative to gasoline, as less energy is consumed in its refining and because diesel engines use oil energy more efficiently than gasoline units.

At present, the amount of diesel fuel available in Ontario is limited to a nearly fixed fraction of the crude oil that is refined here. Two approaches may be considered for increasing the amount of diesel fuel refined in Ontario from crude oil:

- production of diesel fuel at the expense of light fuel oil while replacing fuel oil used in home heating by other fuels, such as natural gas; and
- production of diesel fuel at the expense of gasoline.

Although both approaches make more efficient transportation use of available oil, the first approach is preferred since the second one consumes more refining energy.

Propane

Propane, a natural gas and refinery by-product, is currently being actively promoted for use in commercial fleets through Ontario's Drive Propane program, which was described in the previous Newsletter. If most of the available propane in Ontario were used for transportation fuel, it could replace about 10% of our present gasoline consumption.

Natural Gas

Natural gas can be used as a transportation fuel in the same way as propane, but it requires different technologies for on board storage. It must be stored under high pressure – approximately 17 000 kPa (2500 psi) or higher – or as a cryogenic liquid (at -162°C).

Technology for high pressure storage and refuelling is being developed in Canada, and when refuelling facilities are more readily available, compressed natural gas (CNG) will become another alternative to gasoline in Ontario. CNG is already seeing considerable use in some parts of Europe and in New Zealand, and may have wide application in Canada because natural gas is plentiful. Technology for liquefied natural gas (LNG) fuelling and on board storage is not yet fully mature; hence, the widespread use of LNG as a transportation fuel is still in the future.

Natural gas can also be used as a feedstock in the production of liquid fuels (i.e. methanol or synthetic gasoline) that can be used and stored as conventional fuels. Such use of natural gas will depend of course, on the ultimate economics of the production processes.

Ethanol

Ethanol, or grain alcohol, can be prepared by fermenting carbohydrates that are found in agricultural crops such as cereals (corn, barley), potatoes, sugar beets, or Jerusalem artichokes. Straight ethanol can be used as a transportation fuel in

engines specifically designed for it. The design changes from conventional gasoline engines are not very major, and such engines are commercially available in Brazil, where straight ethanol is used as a transportation fuel.

A more common use of ethanol is in dilute blends of unleaded gasoline, usually 10% ethanol. This product, called gasohol, can be used in unmodified gasoline engines and is being used in some parts of the U.S.A. and throughout Brazil. It is estimated that if about one quarter of Ontario's unused agricultural land were used to produce a suitable feedstock, 10% of Ontario's gasoline needs could be met by ethanol. Smaller amounts, for local or farm use, could be made from spoiled or excess agricultural crops.

However, the cost of present production processes could make ethanol more expensive than gasoline.

Methanol

Methanol, or wood alcohol, can be made from any carbonaceous material, including coal, natural gas, oil, peat, and biomass (wood, garbage, etc.) It can be used in a mixture (up to 10%) with gasoline in standard gasoline engines with minor modifications. Small performance problems may occur in some vehicles, since methanol is not quite as compatible with gasoline as ethanol.

The use of straight methanol requires specially designed engines of precisely the same type as required for straight ethanol use.

The potential for methanol production in Canada is considered to be very favourable due to the wide range of feedstock that can be used. However, since Ontario has only biomass resources, liquid fuel produced here cannot, at present, be more economical than fuel from the western provinces, since coal and natural gas are still the cheapest resources for the production of this product.

Further research and development is needed in order to make methanol production from biomass competitive with processes using fossil fuel feedstocks.

Did you know?

Transportation swallows almost one-half of the oil consumed in Ontario, at an annual cost of over $4 billion.

Synthetic gasoline can be produced from carbonaceous materials such as coal, natural gas, lignite, and biomass. While higher manufacturing costs make it more expensive than methanol, it will be dispensed through existing distribution systems and used in conventional engines and, therefore, will not require additional utilization costs incurred by methanol use. Therefore the overall end use costs of these two fuels could be almost identical.

Hydrogen

Hydrogen does not occur naturally in free form. It must be manufactured from materials that contain it, such as water, fossil-fuels, or biomass hydrocarbons. Although most of the hydrogen used in Canada is now produced from natural gas, it is believed that the electrolysis of water will ultimately be the most economical and energy-efficient source of hydrogen in Ontario.

Hydrogen can be used as a fuel in conventional gasoline engines with some modifications; however, the major problem with its use is on-board storage. It may be stored as a compressed gas at pressures of 17 000 kPa (2500 psi) or higher, as a cryogenic liquid (at -253 °C), or through chemical absorption in metal hydrides.

Of these options, hydrides seem to hold the greatest promise, their major disadvantage being weight. A typical hydride storage tank for a standard automobile weighs about 300 kg (700 lbs) and requires a heat-exchange system to extract the hydrogen at the desired rate.

Electricity

Electric vehicles have long been considered to be alternatives to gasoline-powered units. Although many such vehicles exist, they are, and will be, limited by battery energy storage capacity and battery weight to specific transportation applications for some time.

One example of such an application would be a delivery van that has a daily travel range of about 60 km and duty cycle with low top speeds and frequent stops. Another application would be an 'urban car' – a vehicle with a 120 km driving range and 70 km/h top speed – in which the battery would constitute one-third of the total weight. Such cars could meet about 95% of the daily travel required of a second family car.

They could be recharged overnight from a standard household outlet, and if the electricity came from nuclear generation, the use of such vehicles would reduce oil consumption.

Of all the above alternative fuels, only propane and, to a lesser extent, natural gas , will make significant contributions toward meeting the 2% oil displacement goal for 1985. By that time, ethanol could have some limited applications, and by 1995, methanol and electricity are also expected to contribute toward meeting the goal of reducing by 10% our dependence on oil based fuels. Significant use of hydrogen will probably not occur until the next century.

POSSIBLE APPLICATIONS OF ALTERNATIVE TRANSPORTATION FUELS IN THE 1980s

Fuel Type	Supply and Availability		Private Cars	Commercial Fleets		Transit		Off-road (farms, factories)
	Ontario Production	Outside Ontario		Light Truck Vans/Cars	Medium/Heavy Trucks	Buses	Rail	
Propane	E	●	◐	●	◐	◐	◐	◐
Compressed Natural Gas		●	◐	●	◐	◐	◐	–
Liquefied Natural Gas		●	◐	◐	◐	◐	◐	–
Hydrogen	●		◐	◐	◐	◐	◐	–
Ethanol Blends	● E		●	●	◐	–	–	●
Straight (100%) Ethanol	● E		◐	◐	–	–	–	◐
Methanol Blends	● E		●	●	◐	◐	◐	◐
Straight (100%) Methanol	● E		–	●	–	◐	◐	◐
Methano Emulsions	● E		◐	–	◐	◐	◐	◐
Vegetable Oils	●		–	–	–	–	–	◐
Electricity	●		◐	◐	–	●	●	–

E Ontario Processing of External Feedstock

● [illegible]

◐ [illegible]

– [illegible]

Brantford Installs Computerized Traffic Control System

The City of Brantford is in the process of installing a computerized traffic control system that should save area residents thousands of dollars on their gasoline bills each year.

The new control system is one of three Municipal Traffic Control System (MTCS) demonstration projects receiving a 75% special subsidy. For Brantford and the Regional Municipality of Durham, this is provided through a federal-provincial bi-lateral funding program.

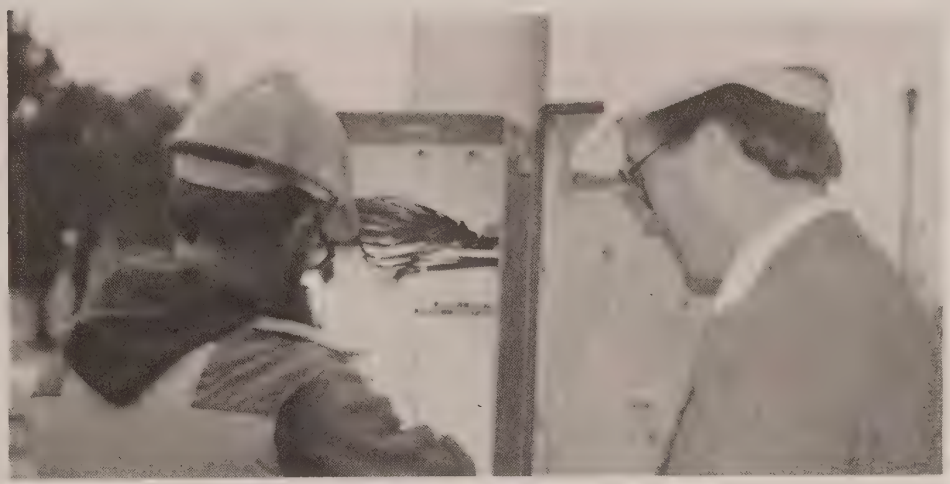
In the Regional Municipality of Waterloo, an Ontario Government subsidy (MTC and Ministry of Energy) covers the entire 75% share, while the municipal share in each case is 25%. The total cost of Brantford's system was $620 000, of which the city paid 150 000. In return for this special subsidy, the municipalities have agreed to undertake a transportation energy management program, with the goal of 10% annual saving in total transportation fuel consumed within the municipal boundaries by the end of 1985 — over and above savings expected from automobile fuel efficiency improvements.

The Brantford system consists of a central computer, 59 control boxes at various locations throughout the city, and 22 detector stations installed in the pavement to record travel density automatically. This project is unique in that the city installed all the equipment itself. Bell Canada and Canadian General Electric are installing the equipment for other MTCS projects.

The computerized system will provide more accurate synchronization of traffic signals, and will save energy by making traffic flow more smoothly. Based on the results of a recent traffic operations study, the city has adopted four timing plans: a.m. peak; p.m. peak; off-peak and evening. Data stored by the computer will help determine future adjustments to timing.

The city hopes to improve traffic capacity by approximately 15% saving the public thousands of dollars in transportation fuel each year.

The entire system should be operating by early spring after personnel have been trained on the new equipment.



A technician examines the control panel for the computer that will provide centralized control for the City of Brantford's traffic signals.

Other Energy Saving Measures

The energy conservation measures to be adopted by Brantford in return for the funding will also add up to impressive savings. The city is currently developing a monitoring program to measure these savings.

Certain of the city's stop signs will be removed to help conserve energy. Elimination of a four-way stop at just one intersection — Fairview and Willow Streets — will save an estimated $50 000 in fuel costs annually.

The city's new five-ton dump trucks will be diesel powered. Diesel-powered vehicles in the current fleet average 37 L/100 km (7.6 mpg) while gasoline-powered units consume 94 L/100 km (3 mpg). In addition to the policy of buying smaller cars and pick-ups, Brantford has converted four new vans and a pick-up truck to operate on propane.

A preventive maintenance program for the municipal fleet has paid off. Use of an oil analyzer and conversion to long-life oil have increased the oil life in municipal vehicles by 500 %. Vehicle operators are encouraged to reduce idling times, minimize trips, and substitute travel with telecommunications.

Design improvements to some of Brantford's streets will improve efficiency of the local road network — and, as a result, lower energy consumption. The city will also introduce a carpooling program for city hall employees as another energy-saving measure.

Other municipalities considering installation of computerized traffic control systems include London, Mississauga and Burlington. Oakville has recently signed an agreement with Canadian General Electric for the installation of an MTCS type system in 1982.

Computerized traffic control is proving to be a wise investment offering significant savings to Brantford and its taxpayers.

Through this investment and the related actions, the City of Brantford has made an important commitment to conserve precious energy and to help its residents cope with increasing fuel prices.

Peter Derbyshire of the City of Brantford's Maintenance Department puts the finishing touches on a control box installation, as Roads and Traffic Engineer, Wayne Woods, looks on.

Municipal Transportation Energy Seminars for 1982

MTEAC, in co-operation with the Ministry of Transportation and Communications and the Ministry of Energy, invites you to attend a series of municipal transportation energy seminars. They are currently scheduled to be held in 1982, at the following locations:

Location	Day	Date (tentative)
1. Barrie	Thu	April 1
2. London	Tue	April 6
3. Kingston	Thu	April 15
4. St. Catharines	Thu	April 22
5. Mississauga	Tue	May 11
6. North Bay	Tue	May 18
7. Sault Ste. Marie	Thu	May 20
8. Scarborough	Tue	June 8

The seminars will provide a forum for municipalities to exchange information about experiences in energy conservation in the transportation sector as well as learn the state-of-the-art techniques for evaluation.

The morning sessions will start with an update on the oil situation, particularly in terms of supply/demand in Canada and, specifically, Ontario and the implications of the recent Federal/Alberta pricing agreement.

The recent progress in the Transportation Energy Management Program (TEMP) will also be covered, touching on Ridesharing, DriveSave, Trucksave, Drive Propane and Alternative Fuels. The prime emphasis, however, will be on transmitting the highlights of MTEAC's Transportation Energy Analysis Manual (TEAM), which is in production.

After a morning introductory session, there will be several concurrent worksessions in the afternoon, covering a wide range of topics including:

- Traffic Management
- Parking Control
- Preferential Treatment of High Occupancy Vehicles (HOV)
- Transit Service Improvement
- Fleet Management
- Maintenance Practices
- Ridesharing
- Land Use Planning

By running the sessions concurrently, there will be enough time to thoroughly explore each topic. The number of simultaneous sessions will be 2 or 3 depending on the number of participants and the amount of interest expressed.

In order for us to design a program that would be most beneficial to all of you, we need early information about your interests. We have enclosed a pre-registration form which also will allow you to number the possible sessions in order of importance.

A minimum of approximately 40 registrations will be required in any location for us to be able to arrange the seminar. Your pre-registration will enable us to reserve appropriate facilities.

We are quite excited about this seminar series, the second one MTEAC has presented. Your interest will make this series a success, and we encourage you to register as soon as possible.

Jouko Parviainen

Jouko A. Parviainen
Vice-Chairman MTEAC

Brampton - Mississauga Transit Link

Mississauga Transit has initiated a local transit service on Highway 10 between Square One and the Highway 7/Highway 10 business district in Brampton. The service replaced a GO Transit local bus service from Brampton through Mississauga (the Cooksville area) to the Islington subway station. The GO buses were carrying between 400 and 500 passengers per day on 27 one-way trips.

Within weeks of its initiation, the replacement service, operating 40 trips per day, attracted an average weekday ridership of 800 passengers (70% adult and 30% student or reduced fare). With 30% of the passengers transferring free and the present reduced fare/adult fare ratio, the average fare is 82¢ and the revenue/cost ratio is 0.97.

Since the new service has attracted over 300 more passengers per day than did the old one, the demand for auto travel in this corridor has been reduced, resulting in a significant petroleum saving. Furthermore, the new service provides transit capacity that can be expanded rapidly as energy becomes either more expensive or less available in the future.

Mississauga Transit offers link on Highway 10 to Brampton.

Ontario

Ministry of Transportation and Communications
Hon. James W. Snow, Minister

Ministry of Energy
Hon. Robert Welch, Minister

If you'd like to receive this newsletter, or know someone who would, please fill out this form and mail it to:

Frank Cherutti,
Executive Secretary,
MTEAC,
3rd Floor, Central Building,
1201 Wilson Ave.,
Downsview, Ont.
M3M 1J8
(416) 248-7296

Name: _____

Agency: _____

Title: _____

Address: _____

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Is your address label correct? If not use this form to advise us of the change.

ISSN 0226-9384

TRANSPORTATION ENERGY NEWSLETTER

MTEAC

MARCH, 1982

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES, AND THE PROVINCE OF ONTARIO

VOL.1 NO.4

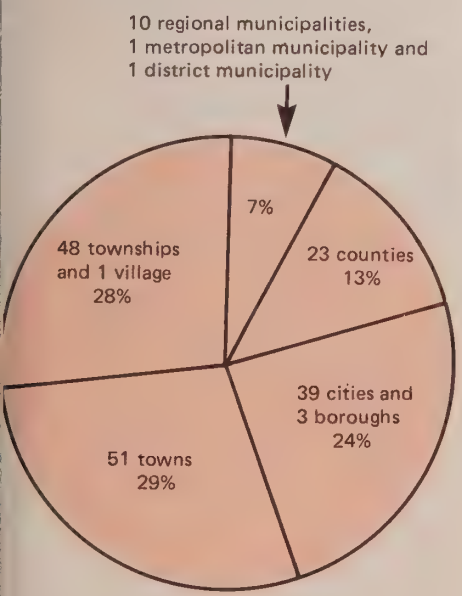
Municipal Transportation Energy Conservation Survey Now Completed

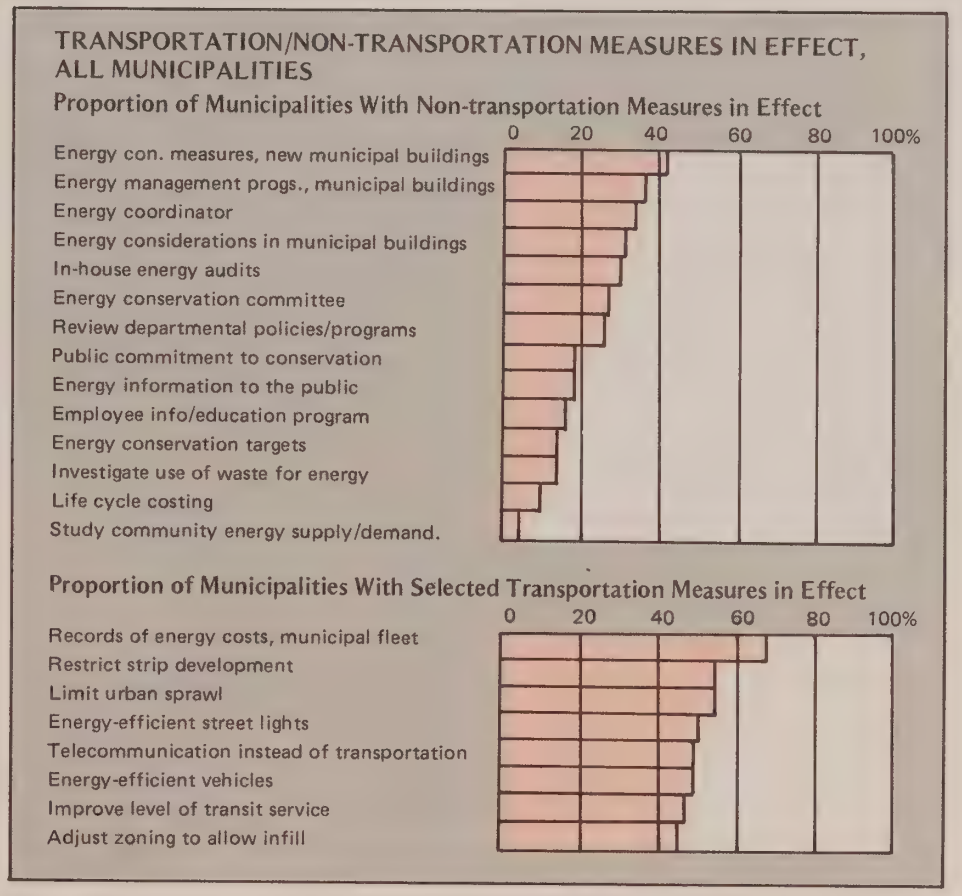
In mid-1981, MTEAC commissioned a survey of Ontario municipalities to determine actions and policies currently in effect to conserve transportation energy. A team headed by Reg Lang and Audrey Armour of York University's faculty of Environmental Studies conducted a detailed questionnaire survey of municipalities with a population of 5000 and over.

Responses were received from 177 municipalities (77% of those contacted) who together represent more than 80% of the province's population.

A summary of the survey's findings, "Transportation & Energy Conservation in Ontario Municipalities," will be available soon from MTEAC. This article contains highlights of information to be found in that report.

SURVEY SAMPLE





The Energy Conservation Response

To place transportation energy conservation in perspective, the survey looked briefly at 14 non-transportation measures. As the accompanying diagram indicates, actions aimed at municipal buildings top that list. Appointment of an energy coordinator, energy considerations in municipal planning, and in-house energy audits are also relatively popular.

Eight of the 70 transportation measures examined, however, are more commonly applied than *any* of the non-transportation measures. Transportation-related action received high, often the highest, priority from Ontario municipalities concerned about energy.

But priority is only part of the picture. Three aspects of municipal transportation energy conservation need to be emphasized. First, the level of activity is still fairly low: the "average" municipality has applied only a fraction of the available measures.

Secondly, some types of action are much more likely to be taken than others. The

average municipality claims to have in effect 36% of the measures in the land use planning and control category and 29% of those related to municipal fleet and operations. However, it has pursued a much smaller proportion of the possible actions in the other categories.

And thirdly, the extent of activity varies considerably among municipalities: larger cities tend to be more active than smaller towns.

Municipal Fleet And Operations

Of the 17 measures in this category, five are being applied by 40% or more of the municipalities. These are:

- maintaining records of transportation energy consumption and costs for municipal vehicles;
- switching to energy-efficient street lighting;
- substituting telephones or other forms of telecommunications for transportation;
- switching to more energy-efficient vehicles; and
- converting vehicles to alternative fuels such as propane or diesel.

Measures aimed at vehicle operators and municipal employees tend to be the least used.

Traffic Control And Regulations

The level of activity in traffic control is comparatively low. Only two measures are in effect in more than one-third of the municipalities:

- undertaking capital improvements in the municipality's street system to remove bottlenecks; and
- increasing the enforcement of speed limits.

Parking-related measures tend to be least often used.

Municipal Concern Over Energy

Approximately half of the municipal officials responding to the questionnaire do not foresee significant energy problems confronting their municipalities during the next 5 to 10 years. Only 15% anticipate such problems; 32% do not.

Nearly half of the municipal officials consider it unlikely that shortages of transportation fuels will occur in their areas during the next five-year period. Should such shortages occur, however, many municipalities would be vulnerable since a high degree of out-commuting to work is common, with most of this travel by automobiles.

The typical public transit system is used by only 5% to 10% of the work-bound population (a few large municipalities are exceptions). For a large majority of those in the survey, public transit is not an option.

While future energy problems and fuel shortages may seem remote and speculative, rising fuel costs clearly are not. The majority of municipal officials responsible for transportation operations report concern over the rapidly increasing cost of fuel.

Transportation Contingency Planning

Very few municipalities have undertaken transportation contingency planning to cope with the effects of possible fuel shortages and rapid price increases in their operations. No municipality has brought into effect a contingency plan to deal with possible transportation fuel shortages on the community at large.

Community Outreach

Measures in this category include:

- providing public information;
- presenting educational programs on transportation energy conservation;
- introducing the subject into high school curricula and driver training programs, and
- publicizing municipal accomplishments.

The general level of such outreach activities is quite low; half the municipalities have not even considered them.

Public Transit

Of the 11 measures in this category, only two are now used by more than a third of municipalities with responsibility for transit systems — increased levels of service to improve convenience, and special events service. Measures most often "not considered" are those aimed at transit operators and employees.

Land Use Planning And Controls

Response to this category was high, drawing into question the motivations of municipalities applying such measures. For example, over half of the municipalities are limiting urban sprawl and restricting strip development, familiar actions pursued for reasons other than energy conservation.

On the other hand, land-use planning and control measures that are more explicitly energy-oriented are seldom used by municipalities. Examples include developing an energy data base for transportation/land use planning or adopting policies on transportation energy efficiency in the official plan.

Priorities And Barriers

Municipal officials most often cited conversion of the municipal fleet to alternative fuels as one of the most effective ways to make transportation in their internal operations more energy-efficient. Also, high on the list were:

- the use of smaller vehicles;
- improved road quality and traffic flow;
- transit service; and
- proper vehicle maintenance.

The main barriers to improving municipal transportation energy efficiency are seen to be the lack of financial resources, absence of political support, and public attitudes.

Turning to the community at large, respondents placed the promotion of car/van pooling at the top of the list of things that could be done to improve transportation energy efficiency. Improved traffic flow and vehicle-engine efficiency, public transit, public education and awareness programs, and higher energy prices were also frequently mentioned.

Perceived barriers to improving the efficiency of the transportation system at large are wide-ranging; lack of political and public support is prominent.

Summary

The report presents an up-to-date picture of how and to what extent most Ontario municipalities are conserving transportation energy. It does not present overall conclusions and recommendations; that was not its intent. But it does reveal some obvious directions.

It indicates the measures currently favoured, and which actions have passed the stage of being actively considered and are now approved. Such measures might move into next year's "in effect" column for many of these municipalities.

Finally, the report draws attention to measures that were expected to receive wider attention, but didn't; and municipalities or groups of municipalities that were thought to be more active in energy conservation, but aren't. Closer investigation is warranted to uncover reasons for this inaction and possible associated barriers.

Overall, a benchmark has been created on which to build further programs and against which to measure future progress.

Save Cash – Recycle Asphalt Pavements

"Asphalt, an oil-based product, is a valuable resource we cannot afford to waste," said the Honourable James Snow, Ontario Minister of Transportation and Communications (MTC), as he summed up his opening remarks at the Ontario Muncipal Seminar on Asphalt Pavement Recycling at the Skyline Hotel, November 10-12, 1981.

Sponsored jointly by MTC and the Municipal Engineers' Association, the seminar attracted 436 registrants – possibly the most well-attended recycling meeting ever held in North America. Over three days it covered all aspects of pavement recycling, including predictions for the future of recycling in Ontario, Canada, and the United States.

The message was clear: the "throw away" philosophy of the past few decades has come to an end. This attitude was reinforced by the wide selection of highly-motivated experts from industry, universities, and highway agencies who came from MTC and all over the U.S.

Participants were mainly from municipalities across the province. There were also, however, significant numbers from the contracting industry, MTC regional staff, Canadian universities, consultants, and provincial highway agencies from British Columbia to Quebec and Nova Scotia.

Snow pointed out that, in 1980, MTC had proved both the validity of the recycling method and the savings available due to rapidly escalating asphalt prices. He urged municipalities to make use of the newly acquired capabilities to recycle.

Frank Kehoe, MTC, continued the theme by showing how the price of asphalt cement would be affected by the National Energy Policy agreement with Alberta. He also predicted that by 1986 asphalt prices could be up to $600/t in Toronto. "And depending on transportation distance from the refineries," he added, "they could reach $1,000/t in some areas of the province."

Representing the U.S. Federal Highway Administration, Doug Bernard revealed that a recent policy statement issued by FHWA indicated any amount of reclaimed asphalt pavement material could be accepted if it met specification requirements for all new mixes – within limitations of the equipment to produce it without pollution.

BOMAG recycler at work patching pavement.

He added that recycled mixes in base layers, surface courses and wearing courses have been placed experimentally. They've served at least as well as new mixes over five years.

Hot surface recycling by planing, scarifying, milling, repaving, and remixing was outlined by Jack Robbins, of J.A. Robbins Construction, Toronto. He discussed the application of rejuvenators in the process, and visualized hot-surface recycling as playing a larger role in future rehabilitation, especially in the preparation of old surfaces to receive a thinner wearing course.

Cold Milling Shows Promise

Chuck VanDuesen, Michigan Asphalt Paving Association, spoke about the new generation of cold-milling equipment and its capability to leave a textured surface cut to a predetermined profile if needed.

Robert Israel, Koehring Bomag Division of AMCA, Ohio, described various types of multiple- and single-pass equipment which are used to "cold recycle" old pavement material in place to form new improved base layers. A new surfacing, usually a hot-laid pavement, is needed in all cases.

Substantial Savings

MTC's Robert Oliver showed that by comparison with alternative designs used prior to the availability of the recycling option, four projects demonstrated savings of $759 418 representing some 14.5% reduction in costs.

100% Reclaimed Material Possible

Robert Mendenhall, Las Vegas Paving Corporation, Nevada, known as the "father" of hot-mix recycling because of his development of the split-feed drum-mixer concept, reviewed his various early attempts to design hot-mix recycling plants.

In addition, he unveiled his latest brain child, a drum mixer that can recycle 100% reclaimed material without pollution, but is limited in production to about 60 t/h. Nevertheless, this newest technique holds the promise that high recycling-mix ratios can be produced in batch plants which have 100% dried and heated reclaimed material fed into it, instead of reclaimed material directly from stockpile.

Len Racciopa, Repac Construction, Toronto, whose company has recycled over 78 000 t of salvaged asphalt pavement and saved some 3900 t of new asphalt cement, described the first batch plant in Ontario to do hot-mixing recyling. Racciopa confirmed the operation of a GOK pile and the limitations on recycled mix ratios to about 15/85 reclaimed to virgin because of "grocery trade" operation.

"Even in the Dead of Winter"

The use of the BOMAG recycler, a small portable drum producing 5 t/h of recycled mix, was described by George Chong, Research Engineer with MTC. It's suitable for producing hot-mix for patching potholes or for small repair jobs around manholes, catch basins and utility cuts. This drum makes hot-mix now available for this type of maintenance even in the dead of winter. He also noted that hot-mix patches last longer than cold-mix patches.

Each participant received copies of the presentations made by the various authors. These papers were helpful during the actual presentations, and will provide a valuable body of reference on recycling. These papers, which are available as proceedings, can be obtained for $10 from Frank Kehoe, Staff Development and Training, Personnel Branch, MTC.

Municipal Transportation Energy Seminars for 1982

The seminars on energy conservation for municipal transportation will soon begin. If 40 preregistration forms are received for each city, the seminars will be held at the locations noted in the box on this page.

The purpose of the seminars is to provide up-to-date information on energy conservation methods. Specific examples of effective measures will be given as practical guides for energy programs. Presentations in the morning and the workshops in the afternoon will offer insights into conservation solutions.

To begin the agenda, a Ministry of Energy representative will present an update on the oil situation which will include the results of the federal/Alberta pricing agreement. After the Ministry of Energy presentation, the Transporation Energy Management Program (TEMP) will present an update on its progress, with subjects including Trucksave, Drive Propane, and alternative fuels.

MTEAC will continue with a discussion on managing municipal transportation conservation programs, emphasizing the Transportation Energy Analysis Manual (TEAM). The completion, distribution, and potential uses of the manual will be discussed.

A luncheon meal will be provided and the program will continue in the afternoon with municipal energy workshops covering many areas:

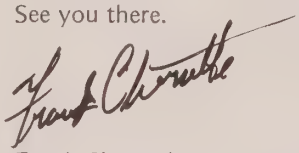
- Traffic Management
- Parking Control
- Preferential Treatment of High Occupancy Vehicles (HOV)
- Transit Service Improvements
- Fleet Management
- Maintenance Practices
- Ridesharing
- Land-Use Planning

A discussion period will follow the workshops, and any personal experiences or questions will be welcomed and appreciated.

We have received many preregistration forms, but the majority have come from central and western Ontario. The seminars in North Bay and Saulte Ste. Marie could be cancelled if more interest is not shown.

For those who are not registered and would like to attend the seminars, we will accept preregistration by telephone by calling (416) 248-7296. (There is no fee for registration). The seminars promise to be an informative and rewarding experience, but the success of the seminars depends on your support.

See you there.



Frank Cherutti
Executive Secretary
MTEAC
(416) 248-7296

Seminar Locations

Location	Date
1. **BARRIE:** Holiday Inn Hwy 400 & Essa Rd. (705) 728-6191	April 1
2. **LONDON:** Holiday Inn 1210 Wellington St. S. (519) 681-2020	April 6
3. **KINGSTON:** Howard Johnson's, 237 Ontario St. (613) 549--6300	April 15
4. **ST. CATHARINES:** Holiday Inn, 2 North Service Rd. (416) 934-2561	April 22
5. **MISSISSAUGA:** Ramada Inn, 5444 Dixie Rd. (416) 624-1144	May 11
6. **NORTH BAY:** Pinewood Inn, Hwy 11 South (705) 472-0810	May 18
7. **SAULT STE. MARIE:** The Water Tower Inn, (705) 949-8111	May 20
8. **SCARBOROUGH:** Howard Johnson's, 40 Progress Cr. (416) 439-6200	June 8

Registration : 8:30 - 9:00 AM

5th International Conference On Travel Behaviour

New title: The Conference on Travel Analysis for the 1980's

Location: Tidewater Inn, Easton, Maryland

Time: 3-7 October 1982

The attendance at this conference will be by invitation only. The final preparations are getting under way right now.

Thank you very much for all your contributions – they have been of great help.

The MTEAC newsletter is a publication of the Transportation Energy Management Program (TEMP), produced by the Ministry of Transportation and Communications in cooperation with the Ministry of Energy.

Ontario

Ministry of Transportation and Communications
Hon. James W. Snow, Minister

Ministry of Energy
Hon. Robert Welch, Minister

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Energy Ontario

TRANSPORTATION ENERGY NEWSLETTER

MTEAC

July 1982

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES, AND THE PROVINCE OF ONTARIO

Vol.2 No.1

Mercedes Beats the High Cost of Fuel

Municipal Works Departments throughout Ontario are facing a period of tremendous change. Fuel costs have risen sharply — as much as 45 percent in one year. Equipment costs are rising rapidly and may increase at an even faster pace in the future.

But Mercedes Nolan of the Ontario Ministry of Transportation and Communications' Equipment Engineering Office has found a way to keep on top of the ever-changing situation. She mathematically analyzes various aspects of fleet operations and uses data to recommend policy decisions.

Mercedes performs this function for MTC's fleet of almost 3000 cars, trucks, snow plows, graders, and other vehicles.

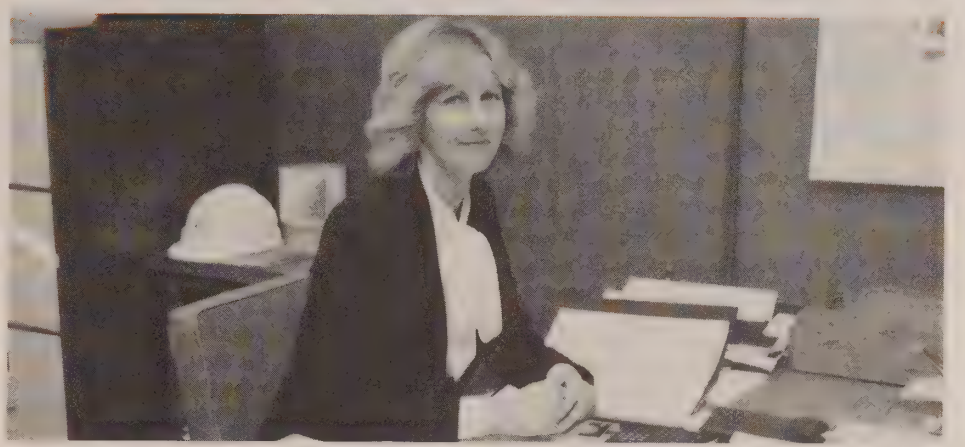
"With a fleet that used $6.1 million worth of fuel in 1980/81, it's imperative that we keep our operations efficient and cost-effective," she adds.

While mathematical analysis of fleet operations might seem like an awesome task at first, it's basically a matter of organizing a reporting system and drawing on the expertise of people in the field, then diligently following up with ongoing analysis of the data.

The rewards are impressive. This type of analysis helped the ministry save over half a million dollars on fuel costs alone last year. And fuel savings are just one of the benefits that can be derived from analysis of fleet management.

The comprehensive reporting and analysis system that Mercedes uses has proven invaluable in determining which vehicles are wasting fuel, pinpointing maintenance problems, and showing which vehicles are over- and under-utilized.

To keep track of such a large number of vehicles, MTC has developed a system whereby each vehicle is assigned a number that tells its year, make, class of vehicle, and sequence within its class. All reporting done by the 18 districts involves that number. History cards are located in each of the district offices as well as the ministry's head office. These cards tell the specifics regarding pieces of equipment, e.g., part numbers, tire sizes, and gross vehicle weights. This information can be used by equipment supervisors when it is needed for tasks such as buying replacement parts.



"Constant increases in fuel and equipment costs mean that now, more than ever, there is an ongoing need for analysis in the fleet management area,"says Mercedes.

Every two weeks, the 18 districts report to MTC, giving information regarding fuel costs and use, repair costs, vehicle use, and downtime. All of this information is fed into a computer, and, once a month, MTC prints a report showing the data. Quarterly and yearly reports are also prepared, and distributed to appropriate personnel.

In addition, management reports are prepared which identify problems relating to specific vehicles. One looks at excessive fuel consumption, another identifies vehicles with high or low usage. And still another can show which vehicles are incurring excessive repair costs.

When a vehicle appears on one of the management reports as a problem, the equipment supervisor for its region investigates to establish the cause. Where appropriate, he takes corrective action and reports back to the Equipment Engineering Office. Results then appear in subsequent monthly reports.

In this way, the Equipment Engineering Office staff helps ensure that individual pieces of equipment are operating efficiently. The reporting system also provides valuable data on the performance of different types and makes of equipment.

Life–Cycle Costing

Once the data have been gathered, they can be used for a number of different purposes. For example, they can determine which types of fuel and equipment options are most cost-effective for each particular operation, and which makes of vehicles should be purchased.

The analysis process used to arrive at these conclusions is "life-cycle costing." This process takes into account the purchase price, interest rates, trade-in costs, maintenance charges, annual usage, and fuel costs over the life of a piece of equipment.

Information used in life-cycle costing comes from a number of different sources. Mercedes obtains the purchase prices from different suppliers; trade-in costs come from MTC auctions and

(Cont'd on Pg. 2)

Mercedes ..... (Cont'd from Pg. 1)

dealers; and maintenance charges and estimates of fuel consumption are determined from the information collected under the reporting system. Mercedes notes that arriving at costs isn't always easy.

"For example, it's hard to estimate maintenance costs on a new type of equipment if no one's actually used it," she said. "However, by looking at the reports on similar makes and types of equipment, we can come up with a reasonable estimate."

"There is no one answer to any problem, " says Mercedes. "Each situation involves different people, different requirements, and different costs. That's why it's important to do an analysis for each case."

"There's also a tendency to do an analysis as a basis for purchasing decisions over a long period of time. But the situation should be evaluated on an ongoing basis, as the costs involved change considerably from year to year.

"Thus, an option that was viable last year might be totally uneconomical this year."

Fuel Conservation Options

The information gathered using the reporting process has been very useful in analyzing energy conservation options.

Over the years, Mercedes has investigated a number of fuel conservation options, including:

- compact rather than full-size cars;
- five-ton diesel rather than three-ton gasoline trucks for ploughing operations;
- larger rather than smaller trucks in shouldering operations, reducing the number of trips;
- diesel rather than gasoline engines in five-ton trucks;
- diesel engines in pickup trucks;
- 10% cutback in winter road patrolling;
- heaters in survey vehicles to reduce engine idling;
- reducing the number of repeated trips travelled each day;
- radial tires for vehicles;
- auxiliary cab heaters to reduce the need for engine idling;
- 6 vs 8 cylinder engines in light trucks; and
- diesel- vs gas-powered light graders (approximately 60 hp).

The most promising measures have been implemented and have resulted in impressive savings for the fleet (see article in box). Mercedes keeps track of the fuel and cost savings resulting from these conservation measures.

Renting vs Buying or Leasing

Here, Mercedes uses the information generated for much more than energy conservation, however. The data are also used to make decisions regarding renting, buying, or leasing of equipment. Costs submitted by the districts are analyzed using a computer model to arrive at the most cost-effective solution for different types of equipment, and for different locations and uses. The analysis includes such considerations as inflation and discount rates, capital costs, maintenance and repair costs, insurance, fuel, administration, licences, and taxes.

Municipal Rental Rates

Mercedes also uses the information gathered from selected municipalities in setting the municipal equipment rental rates. These rates apply to municipally-owned equipment and are the maximum rates that can be charged on subsidized work.

Analysis Pays Off

MTC has found that mathematical analysis has paid off handsomely in terms of a more efficient fleet. Fuel savings, better maintenance, and better use of vehicles are just a few of the payoffs for an organized approach to reporting and analysis!

Analysis Saves Fuel in MTC's Fleets

Implementing energy conservation measures saved the Ministry of Transportation and Communications hundreds of thousands of dollars in fuel costs for its fleet last year.

A major reason behind the Ministry's success is the use of studies and analysis to establish the most cost-effective energy saving measures for its vehicles.

Save with Diesels

One of the earliest measures implemented was the replacement of gasoline-powered five-ton trucks with diesels. Since 1975, 450 of 700 gasoline-powered units were replaced with diesels. This measure alone saved 2.2 million litres of fuel in 1980/81.

MTC also purchased a total of 28 diesel pickup trucks in 1979 and 1980. Prior to the purchase, a payback period analysis showed that this measure would pay for itself in terms of fuel savings in two to three years. The Ministry's Equipment Engineering Office is monitoring the fuel consumption and operational costs of these units.

But, after analyzing new figures for 1980/1981, MTC decided not to purchase any new half-ton diesels. The current figures show that, although the trucks save energy, the payback period is longer due to the sharp increase in the purchase prices of the trucks. Right now there is only one North American manufacturer of half-ton diesel pickups, but pricing may become more competitive if additional companies decide to manufacture this type of truck.

The value of continually updating and revising figures to accurately determine the savings is most important when evaluating energy conservation measures.

Switch to Propane

During 1980/81, MTC converted 27 light vehicles from gasoline to propane, and an additional 107 units in 1981/82. The fuel records of the propane units indicate a reduction in fuel expenditures of approximately 50 percent compared to the gasoline units.

Further savings can be expected in terms of engine maintenance because the oil and working parts are not contaminated by the clean burning propane fuel. The operating costs and fuel consumption are currently being monitored to determine the extent of the savings.

Radials

Still another measure is use of radial tires. Before implementing this measure, the Ministry's Research and Development Branch carried out a study which indicated that radials showed a 6.1 percent fuel saving in winter. Results can vary depending on the operation, vehicle size, and make of tires.

The Ministry currently recommends that radials be specified at every possible opportunity, both on new vehicles and in replacement sets for older vehicles.

Ridesharing

About 30 percent of all gasoline consumed in Ontario is used for commuting — often in cars carrying only one person. Thus, any increase in vehicle occupancy will result in significant energy savings. For example, if vehicle occupancy on commuter trips was increased by just one percent, 34 million litres of gasoline would be saved each year in Ontario alone. Carpools and vanpools are effective and inexpensive ways of increasing vehicle occupancy and of solving the problem of daily commuter transportation.

Today, more than twice as many Canadians ride to work in carpools than in all types of public transit combined. Furthermore, it is estimated that each new carpool saves an average of 2000 L of gasoline annually.

Savings are Many

For the individual commuter, carpooling reduces the strain of driving in rush-hour traffic; saves money on gas, car maintenance costs, and possibly on insurance rates; may make a second car unnecessary; and provides the security of always having a ride. For employers and the community, carpooling reduces rush-hour traffic congestion, noise, pollution, parking requirements, and the need for (and the costs of) building roads.

Vanpool Advantages

Vanpooling has all of the advantages of carpooling and can save even more fuel and money. By taking up to twelve cars off the road, each vanpool can save as much as 30 000 L of gasoline per year (assuming the average round trip of vanpoolers is 80 km).

A luxury passenger van can comfortably transport up to 12 people to and from work. Each rider, except the driver, pays a low monthly fare which covers all operating and capital costs and makes the operation self-supporting. Payment of the fare guarantees the passenger a seat in the van each working day. Vanpools operate on a schedule, usually provide door-to-door service, and are driven by a member of the pool. The vans are owned or leased by an employer, a commuter association, a third-party agency, or an individual.

Carpooling and vanpooling complement both each other and public transit. Transit trips are generally under 15 km, carpool trips are usually over 10 km and vanpool trips are not normally economical under 20 km.

The Ministry of Transportation and Communications.' vanpooling program provides employees with an economical, convenient, and energy-efficient means of travelling to and from work.

The Share-A-Ride Program

MTC currently promotes ridesharing through its Share-A-Ride program. The program involves:

- increasing municipal awareness of ridesharing concepts, benefits, and opportunities;
- securing municipal endorsement of, and/or participation in, the promotion of ridesharing programs;
- promoting employer-sponsored programs to major companies;
- assisting employers in the establishment of ridesharing programs;
- increasing public awareness of the benefits of ridesharing;
- providing information to individuals interested in setting up their own ridesharing arrangements;
- promoting and developing fringe parking lots;
- evaluating other ridesharing options such as ridesharing centres, exclusive ramps and lanes, third party vanpooling, tax incentives, owner operated vanpooling, and preferential parking for high occupancy vehicles.

MTC provides publicity materials, technical assistance, and computer facilities to assist employers, commuter associations, or individuals in establishing carpool or vanpool programs.

To date, 500 of Ontario's largest employers have received information and assistance about ridesharing. Fourteen employers have implemented vanpool programs, with a total of 100 vans currently in operation. In addition, several more companies are assessing the feasibility of implementing a vanpool program.

Ten employers provide an ongoing computerized carpool matching service through the Share-A-Ride program. In 1981, Share-A-Ride participated in many exhibitions and shows as a means of familiarizing the public with the ridesharing concept.

For further information or assistance, contact:

Share-A-Ride
Ministry of Transportation and Communications
1201 Wilson Avenue
Downsview, Ontario
M3M 1J8
(416) 248-7296

SHARE-A-RIDE

CHAIRMAN'S MESSAGE

Gerry Thompson
Regional Municipality of Waterloo

MTEAC has had a successful second year, making transportation energy conservation information available to the public as well as municipal governments. Jouko Parviainen , Vice-Chairman of the committee since its inception in 1979, has moved on to new career opportunities and has been replaced by Terry Robbins of the Ministry of Transportation and Communications (MTC). We extend warm thanks to Jouko for his contributions and a hearty welcome to Terry. There have been, in addition, other changes in the membership of the committee.

The work of the committee has gone steadily forward over the last year with attention focussed on the analysis of the Municipality Transportation Energy Conservation Survey, preparation of the Transportation Energy Analysis Manual (TEAM), and the spring seminars. A short summary of the survey, conducted in mid-1981, was published in the March newsletter and additional information is available on request. The survey provided an effective benchmark to establish current energy program activity in Ontario municipalities. The TEAM will constitute a major output of the committee and should be available by late 1982. The manual is intended to provide needed information to assist municipalities in carrying out transportation energy evaluations and establishing conservation programs.

The spring seminar series, planned for 8 locations across the province, was designed to introduce municipal officials to the concept and the content of the manual as well as to obtain prepublication input. Seminars have been held in Barrie, London, Kingston, St. Catharines, Mississauga, North Bay, Sault Ste. Marie, and Scarborough.

We share an ongoing responsibility as municipal managers to deal effectively with rising energy costs and the possibility of uncertain energy supplies in the future. MTEAC looks forward to your association and support in meeting this important challenge.

Five Ways to Reduce Transit Travel Time

One sure way to decrease the amount of transportation fuel consumed is to create a shift in travel mode from the automobile to public transit. Higher and consistent operation speeds by buses encourage new ridership while creating a faster, more attractive ride for passengers. Improvements could include:

1/ Transit Priority Signal Pre-emption

Before reaching a traffic signal the operator can activate the signal to recall or extend the green light. In addition, transit vehicles could be exempted from turning restrictions, or special signal phases could be provided to help transit vehicles complete their turns with minimum delay.

2/ Reserved Transit Lanes

A more involved measure requires reserved transit lanes which separate public transit vehicles from regular traffic. Reserved lanes can increase ridership and reduce operating costs.

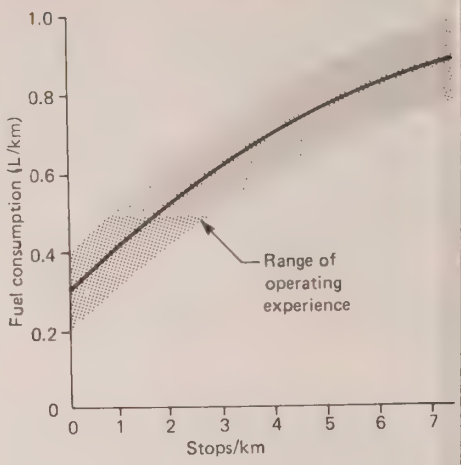
Long stretches of road would not have to be reserved; a short, restricted lane or bypass could reduce travel time in a congested area. For this reason, smaller urban areas could also benefit from restricted lanes.

Toronto and Ottawa have reserved transit lanes, while Vancouver has a whole street (Granville Avenue) restricted to bus and taxi traffic.

3/ Express Bus Service

By eliminating intermediate or local stops, travel time is decreased. Ottawa's express bus service obtains an average speed of 29 km/h, compared to regular peak service of 18 km/h, an improvement of 33 percent. Ottawa-Carleton has combined its express services with bus priority techniques and preferential treatments: arterial "With-Flow" bus lanes, exclusive bus lanes on urban parkways, and priority turning lanes.

Diesel Fuel Consumed Versus Bus Stop Frequency



Fuel required increases with each stop.

4/ Reduced Dwell-Time

Changing from exact-cash payment to monthly bus passes and prepaid boarding areas with double-door loading reduces dwell-time. The Toronto Transit Commission's Wilson Station has had success with the prepaid boarding system.

5/ Fewer Bus Stops

Reducing the number of bus stops per kilometre is another way to increase bus operating speeds and reduce stop-and-go fuel consumption. Where headways are less than 10 minutes, stops should be reduced (see graph). A reduction of stops from seven to five within a kilometre can result in 30 percent fuel savings.

These five transit measures will not be applicable in all situations, but any one method, when necessary and implemented properly, will result in lower fuel consumption and better service.

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Nov. 1982

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Vol.2 No.2

Municipal Energy Seminars A Success

A series of seminars on transportation energy analysis was held in April-June of 1982 at various locations across the province.

Severe snow storms held down attendance at the first two sessions in Barrie and London, but the other seminars proceeded smoothly with a total of 263 people attending the largest session. Three-quarters of the attendants were municipal staff, with provincial staff and representatives from a variety of other affiliations such as transit companies and consulting firms making up the other quarter.

The basic objectives of the seminars were to:

- update the current oil supply and demand situation in Ontario and worldwide;
- provide information about current provincial transportation energy conservation programs; and
- introduce the Transportation Energy Analysis Manual, focussing on specific conservation measures applicable to municipal transportation energy usage.

The seminars were chaired by MTEAC committee members Gerry Thompson, Doug Thwaites, and Heinz Schweinbenz. Following a welcome from a representative of the local municipality, the morning sessions consisted of a general energy overview presentation to the entire group. Afternoon activities consisted of discussions on specific measures, either as workshops where participants chose one of several topics, or as a technical presentation of various energy conservation measures delivered to the whole group.

The MTEAC newsletter is a publication of the Transportation Energy Management Program (TEMP), produced by the Ministry of Transportation and Communications in cooperation with the Ministry of Energy.

MTEAC committee members attended Mississauga seminar.

Presentations

The Ministry of Energy presentation of the oil situation touched on the following points.

- There is a tremendous imbalance in the oil production and consumption figures for the entire western world which creates a dependence on foreign supply.
- Ontario is suffering economically from the transfer of large sums of money out of the province because of heavy dependence on oil.
- Transportation is dependent on oil and, therefore, is a major area for oil consumption savings.
- The commitment of many people is needed to achieve the established oil consumption reduction goals.

The Ministry of Transportation and Communications presented an outline of the various conservation programs that are now underway through the Transportation Energy Management Program (TEMP). These include Ridesharing, DriveSave, Trucksave, Drive Propane, and Teleconferencing.

The session chairman presented information on the Transportation Energy Analysis Manual (TEAM) and explained that it is intended to provide municipalities with a guide to assist them in identifying energy conservation opportunities, and in implementing the appropriate measures that will reduce oil consumption in the transportation sector.

The manual consists of 10 chapters, each covering a particular aspect of transportation energy use and management:

1. Overview and Summary
2. Street Systems Operation
3. Transit Service
4. Ridesharing
5. Travel Demand Management
6. Municipal Fleet Management
7. Road Construction and Maintenance
8. Contingency Planning
9. Managing Municipal Programs
10. Energy Analysis Methods.

(Cont'd on Pg. 2)

(Cont'd from Pg. 1) ..... Seminars

Four of the chapters were distributed at the seminars in preprint form.

The entire document should be completed by next year. It will be sent free of charge to all municipalities in Ontario with a population of 5000 or more, and will be available to others on request.

The morning session ended with a discussion of some of the steps that are necessary to implement a municipal energy conservation program. Seven steps were identified:

1. Get commitment from staff and council.
2. Assign responsibility for the program.
3. Set goals and measurable objectives.
4. Identify possible conservation opportunities.
5. Measure current energy consumption.
6. Implement conservation program.
7. Monitor and report results.

The afternoon sessions dealt with specific energy conservation measures. Two topics were presented at all seminars: Street Systems Operations and Municipal Fleet Management. Requests by the pre-registrants determined the other topics presented, the most popular being Transit Service and Land-Use Planning. The TEAM chapters on these topics were used as the basis for the technical presentations.

Evaluation

MTEAC was assisted in the co-ordination, monitoring, and evaluation of the seminar program by Read, Voorhees, and Associates Limited. Questionnaires were distributed at the close of the seminar for direct audience input. This data will be most helpful in the design of future MTEAC Seminars.

Preliminary evaluation of the seminar program indicates that future seminars are desirable and that there should be a series of detailed workshops on various chapters of the manual. A suitable time might be after users have had an opportunity to study and apply the TEAM manual. Seminars would be a good opportunity for municipalities to discuss particular problems, and this would also provide input to MTEAC as part of the process of updating the manual.

Doug Thwaites, MTEAC committee member for Peel, arrived at the seminar in his electric car.

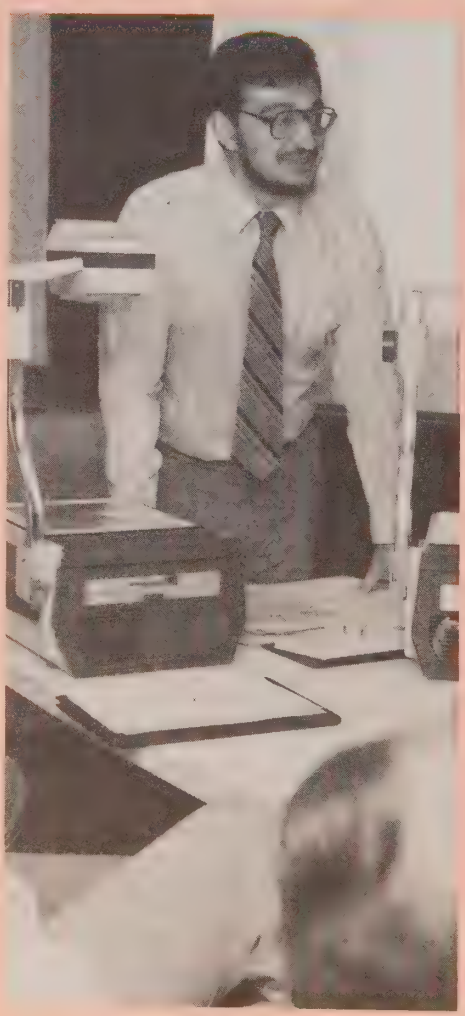
Land-Use Panning Saves Energy and Money

An important part of the MTEAC seminars was the afternoon workshops in which experts in various fields of transportation energy conservation made presentations, evaluating conservation techniques. At the Mississauga Seminar, MTC's David Nitkin, a specialist in the area of land-use planning, spoke to approximately twenty representatives of municipal and provincial governments as well as engineering and consulting firms. He explained how a number of broad social objectives including the saving of money, land, and energy are achieved by effective land-use planning.

Mr. Nitkin pointed out that the physical layout or design of a community can decrease energy usage. For example, people are more likely to use public transit if it is more convenient than parking facilities.

Appropriate street patterns can also promote non-auto trips and reduce trip volumes. Mr. Nitkin suggested that higher density housing should be built near highways and transit systems, to decrease trip length and encourage transit use. Suburban areas should become more self-sufficient by promoting the integration of convenience stores, churches, and employment opportunities locally.

It was pointed out that high residential population density also facilitates energy conservation because of resulting decreases in trip length and an increase in transit use. When employment density is high such as in larger cities, more people use transit. This is due to the increased problems with, and the expense of, parking and the ability to provide better transit service.



David Nitkin, MTC, discusses effective land-use planning.

According to Mr. Nitkin, the greatest opportunities for conservation in land-use planning lie in the development of high density residence and employment activities at selected decentralized locations, and high densities near transit systems. Also vital is the development of already existing serviced areas before permitting leap-frog development, along with encouraging appropriate land-use mixes at the property, community, and submunicipal levels.

In the discussion period that followed Mr. Nitkin's presentation, most comments were directed at the problems of implementation. Some municipal planners stated that they had designed land-use programs but had encountered opposition from council members. Many felt frustrated because it can take years before programs are implemented.

'Our goals of energy conservation must be pursued within the context of broader provincial and municipal objectives,' Nitkin says. For example, by decreasing trip length and frequency, land-use planning not only saves money and energy, but also has other benefits, such as cleaner air and fewer accidents. We can use land-use planning to the best advantage and at the same time, improve our overall quality of life.

Trucksave Challenges Truckers to Save Fuel

Truckers have an image — "Convoy." "B.J. and the Bear." These movies present us with a picture of the trucker as a happy-go-lucky, underdog-turned-hero type of person who will drive his rig through anything, anywhere to save the heroine . . . and always with the hammer down!

Off the silver screen, however, many trucking companies are floundering in the wake of an economic recession. In Tinsel Town, a few dollars wasted on fuel does not matter. But in the real world, a few litres of fuel here or there, over hundreds of trucks and thousands of kilometres *does* make a big difference.

The need to make truckers aware of the importance of saving fuel prompted the Ontario government and industry to join together in forming Trucksave, a co-operative group interested in reducing fuel consumption.

Since it began Trucksave has been producing literature, films and slide shows to reach truckers and make them aware of fuel conservation. But pamphlets and video-tapes can only do so much, so Trucksave opted for a more dramatic approach — a Fuel Economy Challenge. An Economy Challenge that would pit professional driver against professional driver, not only to make more truckers aware of fuel-saving techniques, but to reward those who have already put such practices into effect.

The 1982 Trucksave Economy Challenge consisted of running trucks between *The Fifth Wheel* in Milton and the *Shell* Station at Tilbury one week, and then between *The Fifth Wheel* in Bowmanville and the *Husky* at Joyceville Road the next week.

Truckers who arrived at one of these stations between 7:00 a.m. and 4:00 p.m. on a Tuesday, Wednesday, or Thursday of one of these weeks, could have participated in the Challenge. The driver took an observer with him to make sure that the run was done legally and fairly. Before leaving, the observer got all the specs on the truck and saw that the tanks were topped up.

En route, the truck made a stop at a predetermined weigh station for the observer to record the gross weight and thus determine in which category the truck is running. Upon arrival at the end of the run, the observer witnessed the topping up of the tanks to the point they were at before departure and recorded the number of litres used.

Using the amount of fuel consumed, the gross weight of the vehicle, the distance travelled (officially recorded by a Ministry of Transportation and Communications vehicle) and the weather

1982 ECONOMY CHALLENGE

conditions, a mileage figure is arrived at and recorded to be later worked out in L/100 tonne - km and compared against other trucks in that class.

When the Economy Challenge was first under way, program manager, Ray Camball, felt that there would be a group of drivers who would distinguish themselves from the rest of the participants, and that the other drivers would pick up tips from them. The reality of the situation, however, proved to be much different.

Ontario's professional truck drivers made a supreme showing of enthusiam to save fuel, and the knowledge to do it. This enthusiam, coupled with the individual driver's spirit of competition, has produced consistently impressive mileage figures from participants in all categories. "It's going to be difficult to separate the top drivers in each category," says Camball, "They've all done well."

Although no confirmed mileage figures will be released until at least three weeks after the Challenge ends (October 7), tentative results indicate that the competition is very close in all categories.

In the 27 220 kg to 36 390 kg (60 000 to 80 000 lb) category, Preston and ICL are running very close with their respective test vehicles. The Preston truck from the US, driven by Norman Bennett, looks unlike any other truck on the road today. With its one piece cab-roof air deflector and side fairings, extended and tapered nose, and covered wheels, it is a strange sight on any road. Dubbed "The Batmobile," this Caterpillar-powered tractor has already won a $10 000 prize for fuel economy in the US (over 7 mpg US) and is rendering a similar performance here in Ontario.

(Cont'd on Pg. 4)...

The Batmobile, an experimental Preston vehicle,was a winner in its class (27 000 kg to 36 300 kg).

Bill Capes, ICL, and Diane Richards, MTC

Keeping pace with our southern neighbours, however, is Bill Capes of ICL. Cape's truck has an experimental Detroit Diesel engine with electronic fuel injection, and boasts a front air-dam, cab-roof air deflector, side fairings, covered wheels, and an air deflector underneath the trailer. These modifications, combined with Cape's skill as a driver and mechanic, have produced incredible mileage.

Running in a weight class similar to ICL and Preston is GTL, whose drivers have also been handing in excellent mileage figures. Georges Heider of GTL states "Glengarry is out to win. We've picked our best drivers for this Challenge." When some approximate mileage figures were worked out at the truck stop, Heider's pride was evident "Wait 'till the boss hears about this!"

In the heavier weight classes, Labatt's and Molson have made strong showings both in numbers and in mileage figures. Sears is doing fairly well in the 18 140 kg (40 000 lb and under class), and Canadian Liquid-Air is taking the competition very seriously – to the point of the drivers starting bets among themselves.

In the heavy-weight class of 54 430 kg (120 000 lbs and over), Imperial Oil had no other contenders and it appeared that they would take the top prizes in their category. However, the next week Scott Campbell, an owner/operator, turned in an incredible mileage figure with his 350 Mack conventional and a gross weight of 61 690 kg (136 000 lbs). "I came here to prove a point . . .", says Campbell, "and I did."

With such outstanding performance from virtually all participants, many truck drivers will be receiving prizes such as vests, C.B. radios, truck parts, meal vouchers, and cash – all donated by industry suppliers. More importantly, these truckers will leave the Challenge with a sense of pride in their accomplishment. Hopefully, that pride will spur-on fellow truckers to meet or surpass those accomplishments.

Trucksave, and the drivers who took part in the Fuel Economy Challenge are working to show that the real hero is not the driver who "puts the hammer down" – the heros are the drivers who put the profits UP.

Municipal Action

Let's Hear From You

Since its conception in February 1980, MTEAC has encouraged municipalities throughout Ontario to implement transportation energy conservation measures. Our newsletter has been used to inform city and municipal planners, engineers, and elected officials on the newest, most economical and effective methods of conserving transportation energy. Resized fleet vehicles, computerized traffic control systems, and alternative fuels are just a few examples of informative articles presented in the MTEAC newsletter over the past two years.

Now MTEAC would like to present more information directly from the municipalities. If you have experiences to share with other readers on energy conservation activities, whether they have been successful or not, we would like to hear about them. If you have suggestions and news on transportation energy advances please write or call, and your news can appear in our next edition. It is our goal to start a regular column called "Municipal Action" for news coming directly from municipalities.

We would like some feedback from our newsletter readers – are the stories informative and interesting? Are they too long? Which articles did you like? Which did you dislike? We need suggestions for interesting new features. Also, if there are any upcoming events of interest to municipalities, please use the newsletter to promote them.

I am looking forward to hearing from you and publishing your news in our next newsletter.

Frank Cherutti

Frank Cherutti,
Executive Secretary

Energex Conference Successful

The first annual "Energex" conference was held in August, in Regina, Saskachewan. One hundred thousand attendants from around the world gathered to discuss the quest for energy self-reliance.

Ontario was actively represented by representatives from the Ministry of Transportation and Communications, Ministry of Energy, Ryerson Polytechnical Institute, and the Ministry of Industry and Tourism. MTC representatives displayed a methanol vehicle, literature, and information on the various TEMP programs.

The seven-day conference and exposition was sponsored by over 30 Canadian businesses and government departments. Major organizers were the Regina chapter of the Solar Energy Society of Canada Incorporated (SESCI) and the University of Regina's Faculty of Engineering.

If you'd like to receive this newsletter, or know someone who would, please fill out this form and mail it to:

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Ontario

Ministry of Transportation and Communications
Hon. James W. Snow, Minister

Ministry of Energy
Hon. Robert Welch, Q.C., Minister

ISSN 0226-9384

TRANSPORTATION ENERGY NEWSLETTER

MTEAC

April 1983

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES, AND THE PROVINCE OF ONTARIO

Vol.2 No.3

Pickering Transit Goes Propane

'We're unique, says George Papik, Pickering's Director of Transportation.

He's right. Pickering is the first Ontario municipality to undertake a major propane bus conversion program. Since 1981, seven of their thirteen Mighty Mite (22 passenger) buses have been converted to propane.

Impressive Dollar Savings

The results have been significant. According to an evaluation prepared by Larry Ellerker of the Ministry of Transportation and Communications' (MTC) Transit Office, fuel costs and maintenance costs were lower for the propane-fueled buses than the gasoline-powered buses. These savings contributed to a 15 per cent reduction in operating costs excluding driver wages.

Cost per kilometre went from 25.6 cents with gasoline to 21.7 cents with propane. With approximately 75 000 km travelled per propane vehicle per year, at a saving of 3.9 cents per kilometre, there is an impressive annual saving of $2925 per vehicle.

Not accounted for in the saving are initial costs. These include $2400 for the bus conversion (excluding the federal grant of $400), $1025 for the annual rental of the propane refueling station and $3500 in garage modifications. Since these preliminary expenditures are amortized at approximately $1000 per vehicle per year, over the life of the vehicle, there is still a substantial saving of about $2000 per vehicle per year.

Easier Maintenance

The propane buses have proved beneficial not only to the administration but to the mechanics who service the buses. Carl Malonie, Pickering's head mechanic, boasts of a definite improvement in spark plug life, reporting that one of the Mighty Mites has gone 85 000 km without the plugs being replaced. Malonie also says that since propane is a much cleaner burning fuel, the exhaust system on a propane vehicle will exceed the life of an exhaust system on a gasoline-powered vehicle by 10 000 to 20 000 km.

George Papik, Pickering's Director of Transportation, and mechanic Carl Malonie display one of their town's buses.

Implementing and maintaining the propane operation has been simple work for the public works department. All three of the transit mechanics are certified propane fitters, so all installations and most repairs can be done at Pickering's own garage. The safety of propane-powered vehicles, the most noted public concern, is not a major worry to Pickering employees. In almost three years of operation, they have had only one minor problem—a leaking tank which was the result of a salt build-up in the inlet for the fuel gauge sending unit. The leak caused no damage, and the mechanics have monitored the situation closely with no further difficulties occurring.

Potential For Public Works

The only serious drawback to the implementation of more propane-powered Mighty Mites is that they need to be refueled every eight hours, thus disrupting service. Adding another 200 litre tank to the two tanks already installed would allow 16 hours of uninterrupted service, but at an additional cost of $600 to $800 per vehicle.

Less serious considerations include a longer refueling time and some fuel loss during blow-off. As well, fuel dispensers do not gauge quantities of fuel dispensed as accurately as gasoline pumps.

Due to these refueling concerns, propane is probably best suited to transit routes where vehicles are in service for less than eight hours or where it would be cost-effective to install another propane tank.

Papik and Malonie also agree that propane would be effective for public works' vehicles. "If you're going to have vehicles idling a lot, I'd say propane is a better option than gasoline because you're not getting the extra carbon build-up. It's cleaner burning," says Malonie.

Diesel Demonstration

The municipality's next purchase will be a diesel-powered Mighty Mite. The actual cost, performance and maintenance comparisons of propane with gasoline and diesel fuel will be the best indicator of propane's effectiveness.

In the meantime, Pickering Transit will reap the benefits of their propane Mighty Mites. Reduced operating costs and satisfaction on the part of both administration and mechanics indicate that propane is a profitable alternative.

Saving Transit Dollars

Transit operators are continually looking for ways to cut costs. A key opportunity to cut costs lies in saving fuel. Dave Ferguson, a policy analyst with the Toronto Transit Commission, focuses on four major areas for energy conservation in the transit sector:

- improved fuel efficiency,
- reduced travel,
- increased ridership (modal shift),
- use of alternative fuels.

Improved Fuel Efficiency

To improve fuel efficiency, fuel consumption characteristics must be monitored first to determine which bus operations use the most fuel. Frequent stops, excessive idling, and fluctuating speeds all add unnecessary dollars to already high fuel bills. Specific measures that can be taken to combat these areas of waste are numerous and include:

- express buses,
- reduced dwell times at stops,
- fewer bus stops,
- improved scheduling,
- optimum vehicle scheduling,
- driver training.

Ferguson also noted that improved maintenance can lead to reduced energy consumption. However, he cautions that there must be a balance between regular tune-ups and repairs and additional preventive maintenance. Transit planners have to be aware of the cost-effectiveness of spending more money to keep buses running at maximum efficiency.

Municipal governments can also co-operate in a fuel-saving plan by designating reserved transit lanes, giving transit priority, and improving traffic flows.

Reduced Bus Travel

Reducing the number of kilometres that a bus travels without reducing the level of service is an effective conservation measure. This can be done by improving routing and scheduling, and decreasing or eliminating service that is seldom used.

Municipalities can play an active role by designing subdivision street layouts to best accommodate buses. As well, by increasing land use density, municipalities can help reduce travel distances and, ultimately, costs.

Charles Wheeler of the Ontario Urban Transit Association believes that better co-ordination between builders and planners is the key to energy conservation through land use.

This reserved bus lane on Eglinton Avenue in Toronto is just one example of how municipalities can aid transit companies.

Increased Ridership

Attracting riders is a primary goal of any transit operator. Not only does it result in additional revenue but it helps to reduce our country's fuel consumption. The key to increased ridership is improved service. This can be achieved by expanding service and reducing wait and travel time.

Transit marketing is also vital to increasing ridership. Transit can be promoted by advertising and by providing up-to-date information about schedules, routes and fares. Special fare programs, such as a monthly pass, can also make transit an attractive alternative. In Metropolitan Toronto, this type of program has proved successful with over 80 000 travel passes sold each month.

High parking costs have had a positive effect on transit passenger counts. Ferguson says that price and availability of parking are two of the major reasons for car owners taking transit.

Municipalities can take action in this area too, by enacting auto disincentives such as auto restricted zones, reducing the number of public parking spaces, and encouraging employers to subsidize bus passes in order to compensate for the benefits of employee parking.

Alternative Fuels

At present, utilization of alternative fuels in transit is limited.

Trolley coaches powered by electricity last longer than diesel-powered buses. However, their implementation costs are two and a half times that of a diesel bus.

Ferguson says that if you're starting from scratch, it will always be more expensive to use trolley coaches. However, if governments subsidize the building of the system, it can be financially attractive.

The visual intrusion of overhead wires is another deterrent to the use of trolley coaches, especially in the suburbs.

Methanol is not suited to transit now because of the duty cycle. Methanol is most effective when vehicles are run at a constant speed, which is uncommon for city buses.

While propane has potential for particular types of transit as described in the article on Pickering in this newsletter, conversions to propane are not feasible at this time, since new engines have to be exchanged when a diesel bus is converted. While this is an expensive proposition, Ottawa-Carleton Transpo is considering converting some standard General Motors diesel buses to propane on a trial basis.

The Bottom Line

Not every transit operator will be able to use all these opportunities. However, any transit operator will be able to use one or two of the measures described to save money, and saving money has never been more important.

The MTEAC newsletter is a publication of the Transportation Energy Management Program (TEMP), produced by the Ministry of Transportation and Communications in cooperation with the Ministry of Energy.

DriveSave Benefits All Drivers

In 'The DriveSave Zone,' Ebenezer Scrooge and his sidekick, MOTAC the robot, teach a young couple to drive fuel efficiently.

DriveSave, formed in 1980 under the Transportation Energy Management Program (TEMP), is an energy conservation program aimed at the general driving public. Since automobiles and light vehicles consume one out of four barrels of Ontario's oil, savings in this sector can greatly reduce Ontario's oil needs.

DriveSave aims to reach both beginner and experienced drivers. Through various projects and publications, DriveSave shows clearly how drivers can reduce their fuel consumption.

The program is directed by a fifteen-member committee whose membership is drawn from the Ontario government, and private companies and agencies. Five subcommittees promote and administer the various projects.

Ongoing Driver Education

DriveSave's major activity is a series of ongoing seminars held at various locations throughout Ontario. The one-day workshops are aimed at fleet managers. In a classroom setting, participants are shown two slide shows which demonstrate fuel efficient driving practices. Maintenance, trip planning and route selection, idling, cold-start procedures and general driving tips are covered. To date, there have been over 35 seminars, and as a result roughly 150 companies have started or are starting driver training programs.

The results of these programs have been impressive, too. General Mills boasted a $60 000 fuel saving in 1982 as a result of driver training. London-based Aboutown Cabs have reduced fuel costs by 5-10 per cent through training.

Promotion Important

DriveSave develops informational materials to reach the driving public. The brochure *Improving Fuel Economy* is sent to Ontario's 4.8 million licensed drivers with their license renewal form. The brochure provides tips on fuel economy and facts on tire pressure, cold starts and vehicle maintenance.

A quarterly newsletter is published and distributed to fleet managers and driver educators to keep them informed about the energy situation, conservation developments, and groups and companies that are leaders in fuel efficiency.

The DriveSave team is excited about its most recent project, a film originally intended for beginner drivers. In 'The DriveSave Zone,' Ebenezer Scrooge and his sidekick, MOTAC the robot, teach a young couple to replace fuel-wasting habits with fuel-conscious ones.

The 22-minute film was shown to fleet managers and was so well received that it was decided to make it available to any interested group. The film can be purchased or borrowed for up to two weeks from either MTC or the Ontario Safety League.

To date,DriveSave has made considerable headway in its drive for energy conservation on the road. If you would like more information about DriveSave fleet management seminars, the film, driving tips or fuel economy calculators, call or write to: DriveSave, Central Building, Room 101, MTC, 1201 Wilson Ave., Downsview, Ont., M3M 1J8; telephone (416) 248-3821.

MUNICIPAL TRAVEL HABITS SURVEYED

In 1981, four Ontario cities co-operated with the Transportation Energy Management Program (TEMP) in a survey to establish a travel habits scenario for municipal employees. The survey was intended to be the first in a series to obtain information about travel behaviour, attitudes related to travel, automobile use, and the impact of rising fuel costs on travel habits and attitudes. A total of 648 municipal employees from Ottawa, Sault Ste. Marie, Waterloo, and Niagara Falls took part in the week-long survey.

The survey consisted of a series of questions about vehicle type and use; use of public transit; distance travelled to work, recreation, and stores; as well as the number of kilometres travelled per vehicle during the survey week.

Key findings related to travelling to work were:

- approximately 66 per cent of respondents drove alone to work;
- only 15.7 per cent took part in car or van pools;
- transit was a viable alternative only in Ottawa;
- five per cent of the respondents walked to work;
- the mean distance to work was 12.8 kilometres;
- almost 70 per cent of respondents arrived at work within 20 minutes;
- respondents in Sault Ste. Marie lived closer to work and arrived sooner than their counterparts in the other cities surveyed.

Transit Drawbacks Identified

Participants who regularly drove to work but did not need their cars for business purposes gave the following reasons for not taking transit:

- buses not available;
- door-to-door travel time was too long;
- the closest bus stop was too distant;
- waiting times were too long;
- transfers were a nuisance.

These types of responses are beneficial to transit firms because they identify barriers to transit use and thus can aid in improving service.

(Cont'd on Pg. 4)

Municipal Action:

Hamilton Wentworth Moves On Energy Study

Saving transportation energy is one of the biggest concerns a municipality faces today. The Regional Municipality of Hamilton-Wentworth took a major step toward energy conservation in 1981 when along with the Ministries of Energy and Transportation and Communications, it chose IBI Consultants to assist in identifying a series of measures that would conserve transportation fuel.

The study, now complete, identifies seven measures which could save an estimated eight million litres of gasoline per year from a total regional consumption of 650 million litres. Since the release of the study in July 1982, Hamilton-Wentworth has made steady progress in implementing the suggested measures.

Signal Adjustments Most Effective

Alternative signal timing was identified as the most cost-effective measure as well as having the greatest potential for fuel savings. Although Hamilton has a very efficient fixed-time, interconnected, co-ordinated traffic system, the study found that fuel consumption could still be reduced by 0.6 per cent overall through signal timing revisions. While this is a small percentage, it could mean a saving of up to four million litres of fuel per year in the Region at a one-time cost of approximately $30 000.

As a result of this finding, the municipality obtained the Transyt 7F computer program and is using it to optimize traffic signal timing in the Town of Dundas. The traffic lights on the mountain area of Hamilton are slated to be retimed later this year, and work will follow in the fall on signal timing in the downtown area.

Signal co-ordination and/or actuation has a high fuel saving potential but also has an associated initial cost of $300 000 to $400 000. Due to budgetary constraints, the installation of additional interconnection and actuated controllers where required will be implemented as funds become available.

Installing traffic signals at intersections of arterial roadways which are presently controlled by four-way stop signs was also found to be cost-effective. To date, one location with four-way stop signs which met MTC signal warrants has had signals installed and another will be converted this spring.

Transit Emphasized

Express bus service was also recommended. The Hamilton Street Railway is presently involved in a complete review of maintenance, operations and physical facilities. Express bus service will receive serious consideration along with other potential energy-saving measures such as park-and-ride facilities and skip-stop operation.

Considerable emphasis has been placed on fringe parking lots as an energy-saving measure. Currently, there are three in the Region. The Ministry of Transportation and Communications plans to construct an additional lot in Hamilton-Wentworth this year and three more are scheduled for 1984.

Car and van pooling were other identified measures. Share-a-Ride staff from MTC have visited major employers in the Hamilton-Wentworth Region. The result has been two new van pools and ongoing promotion and assistance in establishing other car and van pools.

Flexible or staggered hours and compressed work weeks were identified as having considerable impact on gasoline consumption. MTC, the Ministry of Energy, and the Region are waiting for the results of a Toronto Transit promoitonal campaign dealing with flexible hours to determine its applicability in Hamilton-Wentworth.

Priorities Established

Hart Solomon, Assistant Traffic Operations Engineer, City of Hamilton Traffic Department, stresses that although funding does not exist at present to fully enact all of these measures, the study was worthwhile because it:

- will result in immediate fuel savings for the measures that are inexpensively implemented;
- established a priority basis for implementing more expensive energy conservation measures as the funds become available;
- compared benefits of fuel conservation measures with the impacts of the disbenefits; and
- provided input for engineering and policy decisions such as the choice of type of traffic control at a new signal location, or the value of removing parking from an arterial.

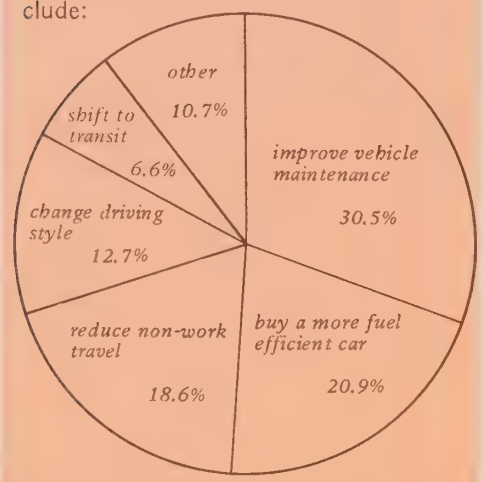
If you would like further information about the study, contact Mr. Hart Solomon, City of Hamilton, Traffic Department, P.O. Box 2040, 71 Main St. W., Hamilton, Ontario, L8N 3T4.

(Cont'd from Pg. 3)

Rising Gasoline Costs

One third of the municipal employees said they would change their driving habits because of rising gasoline costs.

Major measures that respondents would take to save on gasoline costs include:



These survey results will form a benchmark for future comparisons. Not only are they useful for municipal and provincial policy planning, but also for research and development.

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Ontario

Ministry of Transportation and Communications
Hon. James W. Snow, Minister

Ministry of Energy
Hon. Robert Welch, Q.C., Minister

ISSN 0226-9384

Energy Ontario

RANSPORTATION ENERGY NEWSLETTER

MTEAC

Sept. 1983

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES, AND THE PROVINCE OF ONTARIO

Vol.2 No.4

Transportation Energy Analysis Manual Released

When MTEAC was formed in 1980, one of the prime goals set by the committee was to produce a guide for municipalities in developing transportation energy conservation measures. Research revealed a lack of information on energy conservation advances, and this led to the decision to expand the project and prepare a complete manual. While the Transportation Energy Analysis Manual (MTEAC) has been prepared for use primarily by municipalities, it contains information of value to the private sector and to other agencies.

TEAM consists of 10 chapters or booklets that outline the major technical areas where municipalities can save energy. The chapters listed below will be updated as considered necessary.

1/ Overview and Summary
2/ Street-System Operation
3/ Transit Service
4/ Ridesharing
5/ Travel Demand Management
6/ Municipal Fleet Management
7/ Road Construction and Maintenance
8/ Contingency Planning
9/ Municipal Energy Program Management
10/ Energy Analysis Methods

TEAM consists of 10 chapters, each published as a separate booklet. The manual will be distributed free-of-charge to municipalities with a population of 5000 or more.

1) Overview And Summary

The Program Overview introduces the Transportation Energy Management Program (TEMP) and outlines major projects undertaken to assist in the energy efficiency of transportation systems in Ontario, including Ridesharing, DriveSave, Teleconferencing, Trucksave and Alternative Fuels Promotions. The *Overview and Summary* also looks at the relationship between the world economy and the availability of abundant and cheap energy sources.

2) Street System Operation

Effective street-system operation translates into moving people safely and quickly in as few vehicles as possible. This chapter divides energy conservation into four categories: traffic flow improvements, high occupancy vehicles (HOV), bicycling facilities and pedestrian facilities. "Traffic Flow Improvements" stresses that measures originally used to reduce road congestion and traffic flow by reducing stops and delays can also conserve energy. Improvements in the treatment of high occupancy vehicles are defined by this chapter as steps to enhance the people-moving energy efficiency of the street system.

Bicycle and pedestrian facilities are also examined, with an emphasis on Ottawa-Carleton's 60 km network of paths.

3) Transit Service

Hope for transportation energy savings depends to a great extent on the increased use of public transit systems. Some measures discussed in detail include

Cont'd on page 2

Cont'd from page 1

the implementation of reserved transit lanes, express bus service and quicker passenger loadings. Some aspects of transit marketing are discussed, including promotion and effective customer service, as well as the importance of service planning and market research.

4) Ridesharing

In response to increased energy prices and to potential fuel shortages, ridesharing has gained great popularity in North America. This chapter gives a detailed description of various ridesharing options, including carpooling, vanpooling and paratransit. The benefits of ridesharing are listed along with the legalities of ownership, licensing and insurance. Ridesharing implementation procedures are detailed with an outline of the municipality's role in the co-ordination and implementation of programs.

5) Travel Demand Management

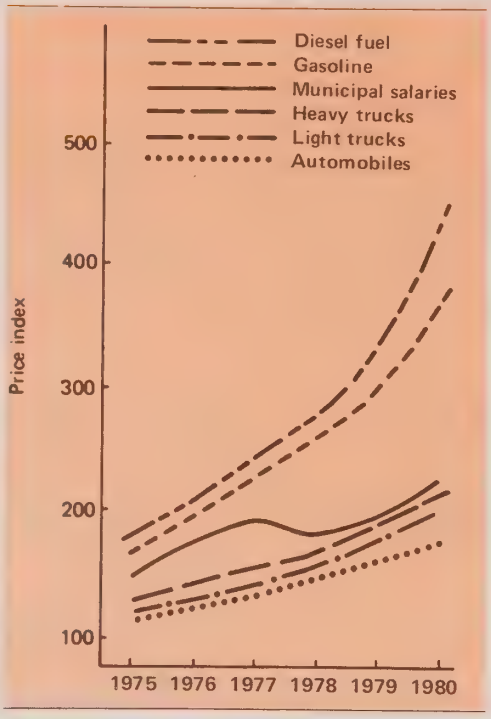
Reducing the demand for travel is crucial to conserving our transportation energy. Chapter five outlines methods for decreasing traffic demand:

- compacting urban development;
- variable work hours;
- road pricing;
- parking management;
- ride sharing;
- auto restricted zones.

This chapter provides a description of each of these methods as well as implementation experience and an assessment of the effectiveness of the measures. Sample energy consumption calculations are also provided so that municipalities can estimate their energy and monetary savings.

6) Municipal Fleet Management

Frequently used energy conservation measures for municipal fleets are examined in Chapter six, with discussions on improved auditing systems, conversion to diesel fuel, vehicle maintenance, fuel-saving devices and vehicle resizing. An efficient energy auditing system is also stressed.



Trends in Fleet Operating Cost Components

7) Road Construction And Maintenance

By reducing energy consumption in road construction and maintenance, a large portion of a municipality's transportation energy dollars can be saved. This chapter discusses methods of energy conservation in terms of reductions in vehicle fuel consumption and increased usage of less energy-intensive construction materials. Of all the construction methods defined as being energy efficient, recycling existing highway surface material is recognized here as being the most promising.

Highlighted is the fact that since asphalt recycling was introduced into MTC operations in 1979, 2.2 million tons of recycled mix were laid resulting in cost-savings of $12.5 million.

Road maintenance conservation measures are also discussed, including the reduction of inspection and patrol, and of minor roadside and winter maintenance.

8) Contingency Planning

The final four chapters all stress the importance of taking a comprehensive management approach in energy conservation program planning. Chapter eight, *Contingency Planning*, looks at the steps to be taken in the event of a national emergency or a petroleum shortage. The roles of the federal, provincial and municipal governments are outlined. The municipal role in the event of a shortage is emphasized, and the outline of a twelve-step process for developing a municipal contingency plan is provided. Also included is a list of possible energy conservation actions for community transportation advisors to enact.

9) Managing Municipal Programs

To be successful, an energy management program must be properly organized. This chapter entitled *Municipal Energy Program Management* provides a framework for municipalities to organize and implement energy conservation programs.

10) Energy Analysis Methods

An essential part of the energy conservation process is the evaluation of the amount of energy and money that has been saved. Chapter 10 of TEAM outlines the three forms that energy savings may take, including:

1/ savings made as a result of the elimination of a vehicle trip or a switch to transit; or,
2/ as a result of more efficient travel, i.e., the elimination of stops and travel on congested streets; or
3/ as a result of the use of different load characteristics or fuel types.

This chapter details the steps and principles to be played in developing and analyzing energy-sensitive transportation improvements, in response to mobility and energy needs.

Overall, TEAM is an invaluable guide to transportation energy conservation measures for municipal planners, elected officials, transit co-ordinators and transportation advisors. It provides Ontario's municipalities with the state-of-the-art information and tools needed to implement comprehensive transportation energy management programs.

The manual is free to all municipalities with a population of 5000 or more, and it may be purchased by individuals at a cost of $30.

For information on the manual, contact Frank Cherutti at (416) 248-7296.

Municipal Driver Training Program Underway

"The driver has the greatest potential for fuel conservation improvements." This concept forms the basis of the Municipal Driver Training Program, *Planning Smarter — Driving Smoother,* an audio-visual presentation produced by the Transportation Energy Management Program (TEMP).

The main thrust of the presentation is the upgrading of present skills rather than the teaching of new skills. The prime goal of the audio-visual program is to make professional municipal drivers aware of the importance of conserving fuel by presenting a number of factors and techniques which would result in more efficient use of vehicles and thereby save fuel.

Consultants and representatives of three municipalities working with TEMP have produced instructional material to teach and encourage energy-conscious driving habits. The teaching aids are tailored to fulfill the needs of diverse municipal vehicle operations, including autos, light trucks, dump trucks, snow plows, graders, garbage trucks, police vehicles, etc.

The MTEAC newsletter is a publication of the Transportation Energy Management Program (TEMP), produced by the Ministry of Transportation and Communications in cooperation with the Ministry of Energy.

Audio-visual Presentation

The result is the production of an audio-visual package that is meant to be both entertaining and informative in order to stimulate use of energy skills. The audio-visual program is flexible enough to be presented to both small or very large groups.

For small groups, there is an automatic single projector slide show, and for larger audiences or special events, the program is presented as a 16 mm film.

Only 25 minutes long, the entire program doesn't demand much driver time.

The introduction to the audio-visual presentation sets the stage for a quiz later in the program by emphasizing the vulnerability of Ontario's fuel supply and the potential savings which can be made by those who actually use municipal vehicles and equipment — operators, maintenance crews and fleet supervisors. It points out that if every operator of public vehicles in Ontario helped cut fuel costs by 10 per cent, the fuel bill would be reduced by tens of millions of dollars.

Drivers Quizzed

The remainder of the program is a 20-minute series of true/false questions on efficient usage of vehicles. Each member of the audience is provided with a copy of the booklet, *Planning Smarter — Driving Smoother*, which defines energy-efficient driving practices. The questions posed help to show exactly what *Planning Smarter — Driving Smoother* means by looking at such ideas as economical route planning, resizing vehicles efficiently, economical vehicle loading practices, and progressive shifting.

The booklet contains answers to the questions posed by the program so that the audience can grade themselves. The answers are supplemented with helpful conservation information and tips.

Overall, the Municipal Energy-Efficient Driver Training Program stresses efficient planning considerations and decision-making operating techniques. Employment of the positive ideas presented by the program will result in significant fuel savings by municipal fleets. The film or slide versions of the program will soon be made available to municipalities. If you are interested, contact TEMP.

The slide show acknowledges the diversity of municipal fleets.

Chairman's Message

G. A. Thompson
Regional Municipality of Waterloo

Recent softening of oil prices seems to have led to a changed public perception of the energy situation – from a potential crisis situation involving shortages to the mere nuisance of substantially increased energy costs at fluctuating price levels. The fact is, however, that Canada is still far from self-sufficient in terms of energy supply – particularly oil. In addition, the political and economic structure of the oil-rich areas of the world shows signs of existing and potential instability which could lead to serious disruption of energy supplies. We must ensure that we use the current crisis-free period to plan productively for energy efficiency before we are faced with shortfalls in supply and /or dramatic new increases in energy costs.

The work of the Municipal Transportation Energy Advisory Committee (MTEAC) is continuing. A major accomplishment during 1983 is the completion of publication and distribution of the Transportation Energy Analysis Manual (TEAM). Preparation of this document, which will be of interest and value to all municipal transportation staff, has been a very demanding task. On behalf of the committee, I would like to express appreciation to the Ministry of Transportation and Communications and Ministry of Energy staff involved in bringing this document through the many review stages to publication. Distribution of the manual will take place in the fall of this year.

The composition of the committee is changed somewhat over last year. We plan to include specialists whose backgrounds are appropriate to the proposed programs for 1983 – 84. These include:

1/ a prototype municipal transportation energy management study;
2/ a computer fleet management demonstration project; and
3/ a study of transportation energy factors in land-use planning.

The committee is looking forward to the year ahead and would particularly welcome input from all interested members of the municipal transportation community.

MUNICIPAL ACTION

Sudbury: Computerized Fleet Management System

The City of Sudbury will be the test site for a computerized fleet management demonstration project which will commence in the fall of this year. This 18- to 24-month project will involve the demonstration of energy conservation practices associated with implementing, monitoring, and reporting on a vehicle maintenance recording system utilizing microcomputers. The fleet management demonstration will include 350 vehicles from the fire, transit, and works departments and possibly the Regional Police.

A survey of selected Ontario Municipalities will be conducted in order to determine what type of fleet management systems are currently in use. Existing maintenance practices and procedures will also be investigated to determine the need for computerized systems in Ontario municipalities.

Appropriate microcomputers will be identified, a software package and a municipal staff training program will be developed.

In effect, the main emphasis of the study will be on energy conservation in the municipal fleet and the transferability of the system developed to other Ontario municipalities. Any municipal representatives interested in providing input for this study should please contact Frank Cherutti at MTC, (416) 248-7296.

High Occupancy Vehicles (HOV)

Is your community adopting priority measures for high occupancy vehicles? If so, a report entitled, *Guidelines for Preferential Treatment for High Occupancy Vehicles,* is now available from TEMP to facilitate your decision. This report outlines the three major areas of HOV preferential treatment: HOV lanes, signal treatments, and parking policies.

The report covers all facets of implementation of HOV priority measures, including:

- data collection,
- planning,
- design,
- evaluation,
- public acceptance, and
- estimated energy savings.

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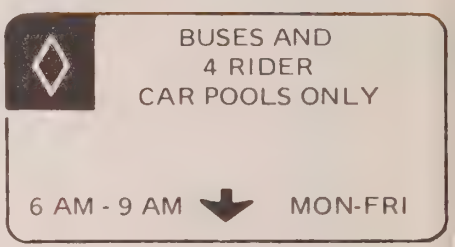

(overhead)

For more information, or a copy of the report, please write to TEMP.

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Ontario
Ministry of Transportation and Communications
Hon. James W. Snow
Minister

Ministry of Energy
Hon. Philip Andrewes
Minister

ISSN 0226-9384

Energy Ontario

TRANSPORTATION ENERGY NEWSLETTER

MTEAC

FEBRUARY, 1984

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES, AND THE PROVINCE OF ONTARIO

VOL. 3 NO. 1

Guidelines Established for Siting Retail Propane Fuelling Facilities

In 1982, discussions with several municipalities and the propane industry determined that there was confusion regarding roles and regulatory responsibilities of the various levels of government in establishing retail propane fuelling stations in Ontario. To rectify this situation, the Ministry of Energy, after consultation with several municipalities, representatives of the propane industry and other involved ministries, has produced a 23-page document, "Guide to Siting Propane Fuelling Facilities in Ontario".

As propane continues to grow in popularity as an automotive fuel, the network of retail propane fuelling facilities will need to expand to keep pace with the demand for the fuel. The purpose of the 'Guide' is to provide an outline of the procedures that an applicant and the municipality should follow in establishing a retail propane fuelling facility.

The 'Guide' sets out in detail, the responsibilities of all parties involved in establishing retail facilities, including contractors, station owners, the municipality and the various government agencies. The legislation and regulations governing the establishment and siting of the facilities are summarized and a list of all acts relevant to siting is provided. A siting procedure is outlined to ensure that the retail facilities are installed, inspected and maintained in accordance with federal, provincial and municipal regulations and requirements. The rights of appeal for both parties from decisions made under the Planning Act and the Energy Act are also documented.

Other information provided in the guide includes:

- provincial licensing requirements for facility owners and operators;
- information on signs and building permits for facilities located adjacent to provincial highways;
- technical information on the properties of propane;
- site plan requirements for applications; and
- a list of agencies, with phone numbers, that an applicant may be required to contact during the procedure of siting, inspecting and maintaining the proper operation of the facility.

One of the many propane fuelling stations now operating in Ontario.

The 'Guide' is available free-of-charge from:

Ontario Ministry of Government Services
Publications Services Section
5th Floor, 880 Bay Street
Toronto, Ontario
M7A 1N8
(416) 965-6015
1-800-268-7540
(Toll-free long distance)
0-Zenith-67200
(Northwestern Ontario)

To complement the booklet, a 10-minute audio-visual presentation has been produced, highlighting information presented in the 'Guide.' Arrangements to view the presentation can be made by contacting:

Ontario Ministry of Energy
Co-ordinator, Transportation Energy
Energy Conservation
56 Wellesley Street W.
Toronto, Ontario
M7A 2B7
(416) 965-0763

Coming up in a future issue of the MTEAC Newsletter will be information on the government inspection program for propane vehicles.

Traffic Management on the QEW

In 1975-76, the Ministry of Transportation and Communications began operating a Freeway Traffic Management System (FTMS) on a 16.5 km section of the Queen Elizabeth Way (QEW) in Toronto. This computer-supervised freeway surveillance and control system was implemented to provide the data required to effectively manage traffic congestion during peak travel periods on the busy eastbound QEW freeway section between the highway 403 interchange and the Cawthra Road interchange.

FTMS is comprised of a traffic surveillance system and a traffic control unit. The surveillance system consists of a series of loop detectors, closed-circuit television cameras and a colour graphic display terminal which monitor the eastbound traffic flow on the freeway.

Pairs of loop detectors are embedded directly into the pavement at six-metre intervals. These detectors measure traffic volume and speed each time a vehicle passes over them. Raw data from the detectors is fed directly into a Nova 4/x traffic control computer thus ensuring up-to-the-minute information on the traffic situation.

Closed-circuit television cameras are positioned every 0.5 km along the 16.5 km route in such a manner that no gaps exist in the television coverage. The cameras are linked to 12 television monitors by a coaxial cable network. An operator from MTC monitors the traffic situation simply by viewing the television screens. If an accident or other traffic incident occurs, the operator will see it and report the problem to the O.P.P. so that the appropriate action can be taken.

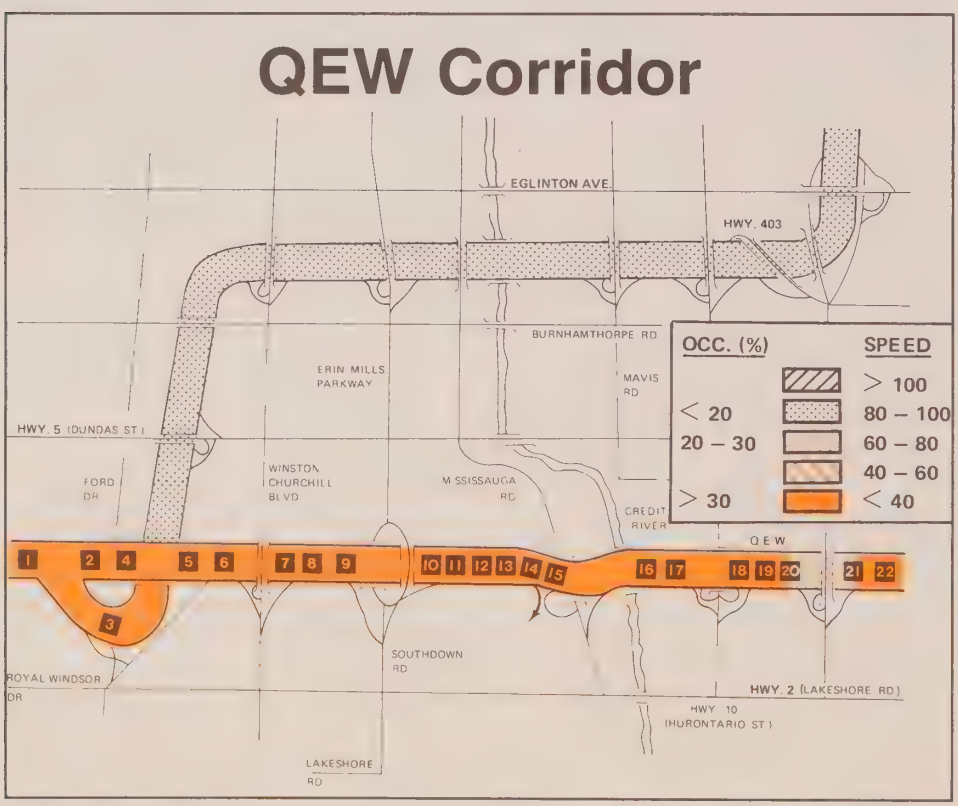
Another interesting feature of the surveillance system is the colour graphic computer display unit which is programmed to analyze traffic data and monitor hardware. The colour graphic terminal shows the operator the actual traffic status by displaying the freeway and its traffic in graphic symbols and colour codes. Each minute the terminal operates, it literally paints a picture of the QEW and its current traffic situation. When a traffic problem is detected in the freeway mainline section, the colour will flash for approximately 10 seconds to notify the operator of the incident. Once again, he must take the appropriate action.

The traffic control unit of the FTMS system is not as elaborate as its surveillance counterpart; however, it does have some interesting features such as changeable message signs and ramp metering devices.

Two changeable signs are located along the 16.5 km route. When the operator learns of a traffic problem, he can change the message on the signs to reflect the current traffic situation. In the future, system developers hope to link these signs directly to the computer in order to change the messages without the assistance of a human operator. Some typical messages are as follows:

- Centre lane closed
- Reduce speed
- Congestion ahead.

Forewarned, motorists can plan to avoid the problem by taking alternate lanes or routes.



On-Ramp Metering

Another control feature is the on-ramp metering device. Each interchange's on-ramp has a queue, demand and passage detector which assesses the ramp traffic during the morning rush-hour period. These on-ramps are also equipped with a ramp controller and a signal light system which regulate vehicle access to the freeway. This control device effectively reduces the traffic congestion which normally occurs whenever oncoming traffic attempts to merge with the mainstream.

The QEW FTMS system was implemented as a pilot program to test the feasibility of a system which monitors and regulates traffic. All indications suggest that the system is an effective monitoring device, and a similar system will be implemented on Highway 401. This new system should effectively reduce the need for new traffic lanes on the 401.

Energy Conservation

Continued from Page 3 . . .

such as land use, servicing and transportation. In developing such plans, attention will have to be paid to social, environmental and economic concerns.

Bill 159 of the new Planning Act (August 1983) states that the Minister of Municipal Affairs will have regard to nine matters of provincial interest, one of which is "the supply, efficient use and conservation of energy". Any official plan not in compliance with specified energy standards could be rejected by the Minister.

Official plans currently reviewed by the Ministry of Energy, and policy statements (according to Bill 159) on transportation energy conservation for consideration by municipalities are currently in review.

Energy Conservation Through Land-Use Planning

Although energy conservation is not specifically mentioned in the Municipal Act, local governments can exert a major influence in the conservation field through effective land-use planning. Ontario municipalities have the power to promote transportation energy conservation within their boundaries through legal avenues such as official plans, zoning bylaws, development permits, subdivision bylaws and the provision of municipal services.

The official plan can be a vital tool for municipal authorities concerned with energy conservation in land-use planning because it documents all the planning and development policies within the municipality. The plan itself has no direct effect on how an individual may use his property; however, zoning and other bylaws must conform with its mandate. Therefore, any energy statements incorporated into the official plan become enforceable through city bylaws.

Although current legislation cannot force municipalities into incorporating energy considerations into their official plans, many municipalities have adopted energy policies because of the resulting substantial savings and good political image.

The cities of Brampton, North York and Ottawa-Carleton have all incorporated energy conservation policies in their official plans within the last five years. The Regional Municipality of Waterloo has recently drafted an official plan which emphasizes energy conservation in both its policy and goal statements.

The Waterloo plan makes an important conservation statement by including a distinct section for transportation considerations which involve the development of higher density locations, offices and employment centres within convenient walking distance of major transit routes.

ECTLUP Study

The Ontario government has established a grant program for municipalities which undertake studies to implement energy efficient land-use plans. The Energy Conservation Through Land Use Planning Study (ECTLUP) has provided grants since 1981 for municipalities which include energy conservation policies and standards in their official plans and zoning bylaws.

The grants are available through the Ministry of Municipal Affairs and Housing until March 1984. Since 1981, twenty municipalities have taken advantage of the ECTLUP grants. Guelph, Windsor, Gloucester, Hamilton, Welland, Durham Region, Ajax and Georgina Township have all completed their ECTLUP studies.

Study Results

The official plan review was a popular task activity in all of the completed studies. The development of more energy-sensitive official plan policies has increased municipal planners' understanding of the relationship between energy use and land use. This increased awareness is most evident in Welland, Georgina and Durham.

An evaluation of the ECTLUP program revealed that some of the individual studies may be difficult to relate to other municipal contexts; however, most of the findings appeared to be transferable to other municipalities. The Welland study is particularly noteworthy. Its organization and format illustrate clearly that there are fundamental principles which have guided land-use planners for decades, and are inherently energy-conserving.

Although official plan reviews will continue to be an important action for municipalities to undertake, it is clear from the completed studies that more thought, time and funding needs to go into the identification of appropriate methods of implementation of the policy in these studies.

The New Planning Act

The Planning Act is the major piece of provincial enabling legislation dealing with urban and rural planning at the municipal level. To date, this Act has had no power to regulate energy considerations in official plans; however, a new Planning Act has been drafted which will affect this area of municipal planning.

The new Planning Act is a culmination of a seven-year review of Ontario's municipal planning system. Much of the former Act has been retained, but there are important additions and changes. For the first time, provincial interests in municipal planning are broadly identified as a framework for local decision-making. These interests include efficient use and conservation of energy, and the provision of major communication and transportation facilities. Under the proposed Act, official plans will focus primarily on physical matters

Continued on Page 2 . . .

Planning Handbooks

There are several government handbooks available from the Ontario Government Bookstore which should aid planners in developing practical transportation energy policies. The following is a list of current and proposed handbooks which might be useful for municipal planners:

- *Energy Conservation Opportunities for Municipalities,* Ministry of Energy, 1980.
- *Energy Conservation Through Official Plans,* Ministry of Municipal Affairs & Housing, 1982.
- *Energy Efficiency in Municipalities: The Law,* Ministry of Energy, 1980.
- *Estimating Energy Consumption for New Development,* Ministry of Energy, 1983.
- *Handbook for Energy Efficient Residential Subdivision Planning Transportation,* Ministry of Municipal Affairs & Housing, 1984.
- *Land-Use Planning for Energy Conservation,* Ministry of Municipal Affairs & Housing, 1984.

The Ministry of Energy published a series of handbooks which may also be of use to planners concerned with energy conservation.

- *Alternate Energy Supplies and Technologies and their Implications on Land-Use Planning.*
- *Energy and Rural Land-Use Planning in Ontario*
- *Estimating Energy Consumption for New Development*
- *Glossary of Energy Terms for Planners*
- *Guide to Community Energy Profiling*
- *Landscape Planning for Energy Efficiency*
- *The Community Energy Profile*

Harry Sparkman of Molsons, the first-prize winner, achieved an incredible 41 L/100 tonne-km (6.9 mpg) with his Ford Cummins vehicle, 50 170 kg (110 600 lb) GCW.

Challenge Champs!

The 1983 Trucksave Fuel Economy Challenge, September 13th to October 6th, demonstrated the importance of fuel economy as over 100 professional truck drivers matched their skills and vehicles in an over-the-road competition to determine the most fuel-efficient driver and truck.

Although the drivers in all truck classes excelled, Harry Sparkman of Molsons won the overall competition with a remarkable achievement of 0.8208 L/100 tonne-km in the 45 401 kg to 54 500 kg category. Sparkman's result, like that of his competitors, was based on the amount of fuel consumed, the gross weight of the vehicle, and the distance travelled during a run closely monitored by the Ministry of Transportation and Communications.

This year, a new class for MTC vehicles was added to the competition. George Zimmicky of Chatham placed first in this category, driving an International Harvester snowplough. His results, 1.4107 L/100 tonne-km, prove once again that good driving practices can reduce fuel consumption in any type of vehicle.

The Challenge ended this year with an awards ceremony at Canada's Wonderland. Despite a little rain, the ceremony was a great success as representatives from both government and private industry gathered to present prizes such as vests, portable stereos, clocks, and cash to the drivers with the most outstanding performances.

Next year, Challenge organizers hope to encourage more municipal drivers and owner-operators to participate in the competition.

Municipal Action

Ottawa-Carleton

The Region of Ottawa-Carleton is currently undertaking a Transportation Energy Management Study (OCTEMS). The purpose of the study is to develop a transportation energy conservation program which will be implemented over the next five years.

One main objective of the OCTEMS is to create a data base for use in the planning, implementation and monitoring of transportation projects. The primary function of the data base will be to assess the energy impacts of various transportation projects undertaken by the Ottawa-Carleton Region. The data base will be developed on an IBM microcomputer, so that it can be transferred to the region's microcomputer with minimal problems and disruption.

Another objective of the study is to develop a transportation energy contingency plan for the Region of Ottawa-Carleton. The purpose of such a plan is to have in-place programs, organizations and all necessary funding to react quickly in the event of energy shortfalls.

Part of the study will involve a review of the Metro Toronto Transportation Energy Study (MTTES) and the Hamilton Transportation Energy Management Study (HTEMS) to assess their potential suitability and applicability for Ottawa-Carleton.

The final report will be completed at the end of April 1984 and will be summarized in a future newsletter.

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☐ *New Request?* ☐ *Change of address?*

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The MTEAC newsletter is a publication of the Transportation Energy Management Program (TEMP), produced by the Ministry of Transportation and Communications in cooperation with the Ministry of Energy.

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VOL. 3 NO. 3

Breaking The Brake Habit

Traffic control devices should be installed when their use is warranted by realistic safety and traffic flow considerations. However, studies now show that many such installations have been carried out for reasons other than those contained in MTC's *Manual of Uniform Traffic Control Devices.*

It has been found that such unwarranted installations often result in increased intentional violations by drivers, a false sense of security on the part of pedestrians and a considerable waste of energy.

In fact eliminating unnecessary stop signs means big savings in several important areas. It cuts wear on brakes and tires, it reduces exhaust pollution and driver frustration, and it slashes fuel consumption.

Save Fuel

Unwarranted stop signs have been called the municipality's biggest fuel waster. A recently completed Metropolitan Toronto Transportation Energy Study recommends the removal of unwarranted stop signs as its number one priority. It considered 50 to 75 per cent of existing four-way stop signs unnecessary.

The study estimates that an astounding 21 600 000 to 32 400 000 L of fuel would be saved annually if all unnecessary stop devices in Metro were removed. At 45¢/L of fuel, this would save $10 million — plus!

The amount of fuel wasted at each unnecessary stop can be estimated quite accurately. With a running speed of just 48 km/h, an average of .038 L of fuel is wasted each time a vehicle stops. An additional .008 L of fuel is consumed during each second of further delay. At the higher speed of 60 km/h, the average vehicle wastes .0636 L of fuel to stop and return to its original speed.

In a study of three- and four-way stops, the City of Brantford discovered that an additional 90 920 L of fuel would be consumed if just one more four-way stop was installed.

The Regional Municipality of Durham also conducted a study on unwarranted stop signs and estimated an annual savings of 3 360 000 L of gasoline by changing the stop sign policy in the region. Assuming a litre of gas costs 45 ¢ this could mean a saving of $1,512,000!

Safety Counts

Although energy conservation is the principal reason for eliminating stop signs, there are also other considerations. In a study by the City of North York, the necessity of four-way stops was seriously questioned. It was discovered that not only do few vehicles actually come to a full stop at an intersection, but that most approach and leave at speeds that exceed the speed limit. (See graph, p.2)

Although a stop sign can be a valuable and effective control device

(Continued on page 2)

Why Install STOP Signs?

Stop signs serve three key purposes. They make it clear who has the right-of-way. They overrule Section 87 of the Highway Traffic Act, which states the vehicle on the left must yield the right-of-way to the vehicle on the right. They also eliminate uncertainty, which can improve the traffic flow.

Although energy conservation is the principal reason for eliminating stop signs, safety must take precedence over energy conservation. If a stop sign is genuinely warranted, it must meet the criteria in the Ministry of Transportation and Communications' *Manual of Uniform Traffic Control Devices.* A stop sign can be installed:

- on a street intersecting a through highway or through street;
- at a minor intersection where, because of a restricted view, the safe approach speed is less than 15 km/h and the collision experience indicates the need; or
- the configuration of the intersection requires a more positive stipulation than the basic right-of-way rule.

A three- or four-way stop is installed in areas where:

- the intersection urgently needs traffic signals and the four-way stop can be quickly installed during the interim;
- five or more accidents are reported within a twelve-month period and the accidents are susceptible to correction by the installation of a multiway stop.
- the traffic volume meets the minimum traffic requirements where:
  (a) the total vehicular volume entering from all approaches is greater than 500 vehicles per hour for any eight hours of an average day; and
  (b) the combined vehicular and pedestrian volume from the minor street or highway must average at least 200 units per hour for the same eight hours; or
  (c) if the average operating speed on the major street exceeds 60 km/h, the minimum vehicular volume warrant is approximately 70 per cent of the above requirements.

Brake Habit . . . continued from page 1

when used for the right purposes, stop signs are often installed to act as speed reducers and to ensure safety at pedestrian crossovers.

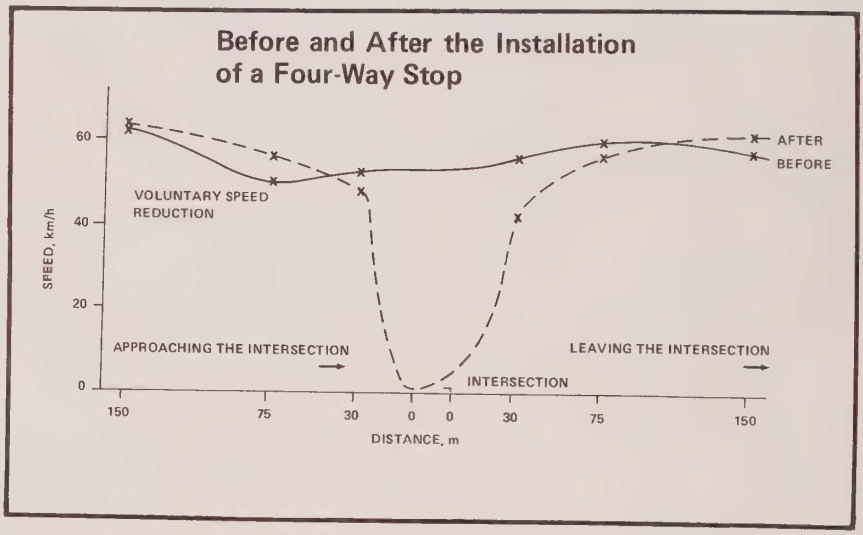
Stop signs are often installed where they are not warranted in order to reduce traffic in an area. Because these signs increase driver irritation, they actually cause more intentional violations and, therefore, are not particularly effective.

Stop signs placed at pedestrian crossovers may actually endanger the pedestrians they were intended to protect. The pedestrians are less cautious about crossing at such intersections as they expect vehicles to come to a full stop and give them the right-of-way.

In fact, causing drivers to stop at *unwarranted* stop signs promotes disrespect for stop signs in general.

"Flash" - LIGHTS

Along with elimination of unnecessary stop signs municipalities are reducing energy consumption by converting traffic lights to flash mode during periods of low traffic volume. This eliminates unnecessary delays at intersections and keeps traffic flowing smoothly.



Main Street Speed Comparison

Reduce Pollution

The removal of unwarranted stop signs also results in a reduction of both noise and air pollution. This is due to fewer deceleration — acceleration cycles per vehicle at intersections resulting in smooth flowing traffic.

By removing unwarranted stops, municipalities can take effective action against energy waste. This is one energy conservation measure with an "instant payback" and can be implemented with very little cost to the municipality. Not only will fuel consumption and exhaust pollution be reduced, but also wear and tear — on both vehicles and drivers.

Propane Inspection

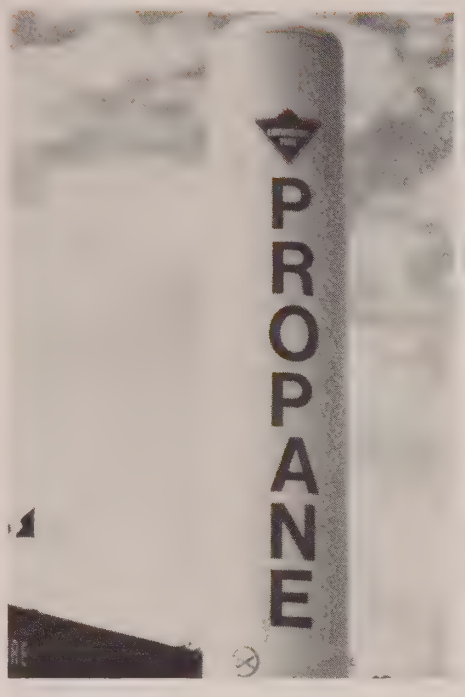
Propane is a safe and significant alternative motor vehicle fuel. But, like gasoline and other flammable substances, it can also be hazardous if improperly handled.

In recent years, there have been a few fires caused by improper vehicle conversions or by problems with hoses, fittings and other parts. These are the problems inherent in the adoption of any new technology, and they have given rise to an important new inspection program in Ontario.

During 1984, all propane-powered motor vehicles registered in Ontario, and operated on Ontario highways, must undergo a fuel system safety inspection. A blue and white sticker will be placed on the lower right inside corner of the windshield of each approved vehicle.

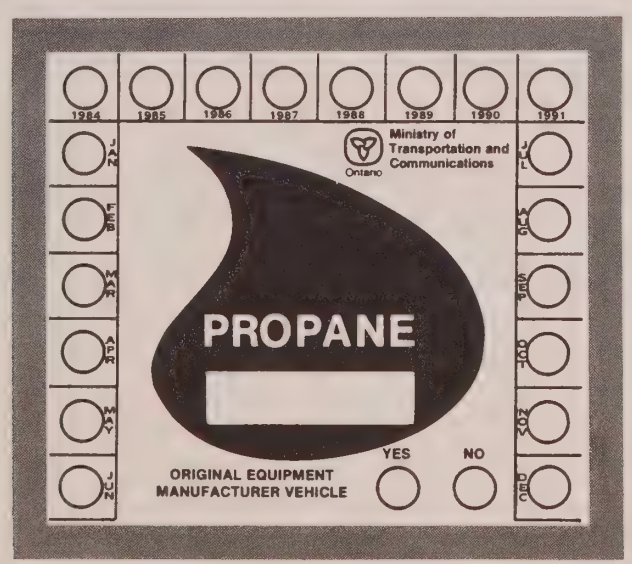
The penalty for driving a propane-powered vehicle without a sticker will be a fine of up to $200. In addition, police and MTC inspectors will have the authority to remove the vehicle's licence plates.

It will be illegal to fuel a propane-powered vehicle without an inspection sticker. The penalty for the fueler is a fine of up to $10,000 or up to one year in jail, or both.



Propane is a safe and significant alternative fuel that is being used by over 50 000 vehicles in Ontario alone

In the future, all propane-powered vehicles will have to display this blue and white sticker in the lower right-hand corner of the windshield in order to obtain fuel.



Vehicles can be inspected at any Motor Vehicle Inspection Station or propane conversion shop licensed to inspect propane vehicle fuel systems. All of these inspection facilities must meet certain requirements and standards set by the Ministry of Transportation and Communications (MTC) and the Ministry of Consumer and Commercial Relations (MCCR).

The facilities must have qualified staff inspectors who have successfully completed a mandatory 12-hour, community college inspection course (S6B). As a prerequisite to the course, a candidate must already possess a motor vehicle mechanic's licence and an S6A automotive propane fitters certificate.

Any station or conversion shop not conducting the inspections properly can lose its inspection licence.

The inspections are being done to ensure that propane conversions have been correctly and safely completed. Any vehicle owner who suspects that a problem exists with the vehicle's fuel system should have it inspected and repaired by a licenced propane fuel system installer. If the vehicle is involved in an accident, the fuel system should be reinspected to ensure that no damage has been done.

The full inspection for aftermarket conversions includes checking for proper approval markings, testing for leaks, making sure parts are mounted securely and in the correct location, and ensuring that the vehicle is equipped with the entire system. The process should take about 20 minutes. There is no set fee for the inspection, so vehicle owners are encouraged to shop around.

If the propane fuel system was installed by a vehicle manufacturer, a less intense inspection is required since manufacturers comply with federal standards during the manufacturing of the vehicle. These vehicles will be checked for leaks, damage, and wear and tear, which should take about five minutes.

(Continued on page 4)

Chairman's Message

Louis Shallal
Regional Municipality of Ottawa-Carleton

Today's perceived "oil glut" should not dim our memories of oil shortages experienced yesterday. As the transportation sector is the major consumer of our oil resources, we should, during this crisis-free period, take the opportunity to plan productively for energy-efficient operations before we are faced with future shortfalls. In addition, it is necessary that we "Think Energy Conservation" in our day-to-day transportation engineering activities.

The work of the Municipal Transportation Energy Advisory Committee (MTEAC) is progressing favourably in 1984 with a number of goals in view.

These include:

1. the marketing of the Transportation Energy Analysis Manual (TEAM), its distribution to municipalities with a population of 5,000 or more and the continuous monitoring and evaluation of its usefulness;
2. the promotion of various programs such as the Municipal Driver Training Program entitled *Planning Smarter, Driving Smoother* and the monitoring and evaluation of their usefulness;
3. the sponsorship and evaluation of various pilot demonstration projects: a shift in emphasis from studies to the actual implementation of feasible solutions to some of our transportation energy problems;
4. the expansion of MTEAC from an advisory body to an action-oriented body serving as a forum to solve transportation energy issues.

With these goals in mind, the year ahead promises to be a successful one for the Committee, and we welcome any suggestions and comments from the municipal transportation community.

Propane . . . continued from page 3

A feedback form will be filled out by the inspector for each propane-powered vehicle. This form will be used by the government to assess the condition of the vehicles, as well as to trace unregistered conversion shops.

The propane inspection program is also part of Ontario's safety inspection required for used vehicles at the time of resale. Whenever the ownership of any vehicle is transferred, the vehicle must be inspected and given a Safety Standard Certificate. This certificate is necessary prior to re-registering a vehicle to operate in Ontario. The fueling system on propane vehicles will be examined as part of the vehicle safety inspection at the time of resale, even if it has a blue and white sticker.

Propane vehicle owners with concerns about inspections can contact a regional or district Driver and Vehicles Office, MTC. If the inspection determines that the propane conversion was not done properly, the vehicle owner should inform the installer and ask to have it repaired. If the installer and the vehicle owner cannot agree on who is responsible for the corrective work, the vehicle owner may take civil action against the installer, as is the case with any work performed on gasoline or diesel vehicles. The complaint should be registered with the Fuels Safety Branch, MCCR.

Municipal Action

Sudbury — Status Report

The Sudbury Municipal Fleet Management Information System (MFMIS) is currently being tendered with the contract award scheduled for mid-summer. This will complete Phase II of the demonstration project which involved recommendations for the purchase of hardware and development of software compatible with a number of microcomputer systems.

The Sudbury demonstration project has sparked a lot of interest because the software package will be available to all municipalities.

The third and final phase comes with implementation and monitoring of the system to be completed by March '85.

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Vol. 3 No. 3

ALTERNATIVE WORK SCHEDULES

Morning and afternoon rush-hour periods have always been a serious concern for conservationists. Due to excessive congestion, cars idle longer and therefore waste more fuel. Not only does this congestion cause greater fuel consumption, but it also results in increased air pollution, transportation operating costs and travel time.

The traditional response to the congestion problem has been to enlarge transit and road capacities. Unfortunately, this often leads to underutilization in the off-peak hours, proving that the extra capacity is only required during two short periods each working day.

While lack of capacity is blamed for congestion, the primary cause lies in the continued use of regular or fixed working hours. As most people work a 9 to 5 day, transportation routes are continually clogged at starting and quitting times.

Alternative work schedules deal directly with this problem by allowing a variation in workday starting and finishing times. This, in turn, decreases peak period congestion and reduces transportation energy consumption. Results of a study completed for the Transportation Energy Management Program (a joint program between the Ministry of Energy and the Ministry of Transportation and Communications) indicate that there are three major ways in which alternative work schedules can reduce energy consumption:

- by increasing the number of transit users,
- by reducing the number of work-related vehicle trips taken,
- by decreasing congestion.

Alternative work schedules can help eliminate scenes such as this.

The energy impact of changes in travel modes can be very large. The City of Ottawa showed a large increase in transit ridership when alternative work schedules were combined with overall transit service improvements. Transit becomes more attractive to all users because crowding in the transit vehicle is reduced as the peak period spreads.

Alternative work schedules have three major variations:

1/ the compressed work week, which allows a five day work week to be compressed into three-and-a-half to four days;
2/ flexi-time schedules, which allow employees to select their own starting and finishing times, but which often require them to be present during a fixed core period; and
3/ staggered hour programs spread out traffic loading by offsetting employee starting and finishing times.

Compressed work schedules are more likely to be implemented in structured job activities where interaction with the public is relatively low. Employers who have implemented compressed work schedules have given them favourable reviews. They find that compressed schedules increase morale, reduce absenteeism and result in fewer startups and shutdowns. Employees have found that a compressed work schedule gives them larger blocks of free time.

Flexi-time and staggered hours are more appropriate for service

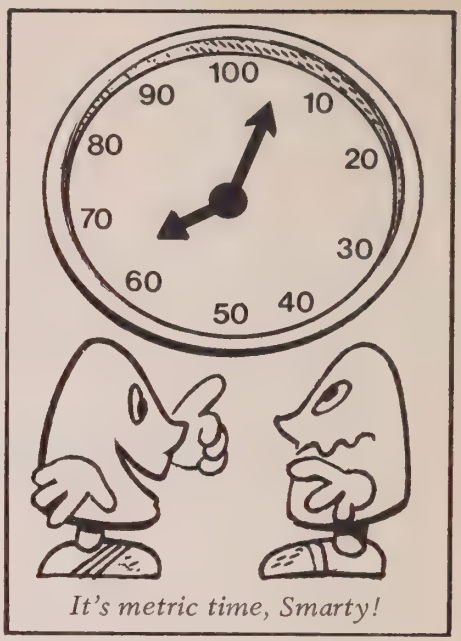
continued . . .

activities where certain core hours must be kept but some latitude can be tolerated at either end of the schedule. Employers find that flexi-time schedules are positive recruiting vehicles, as employees enjoy the adaptability associated with them.

Compressed schedules show a greater potential to increase energy savings than do flexi-time schedules, due to a reduction in total work-related trips taken. In Ottawa, 65 per cent of the alternative work schedule savings can be attributed to compressed schedules. This saving increases to 75 per cent in London, to 77 per cent in Hamilton, and to 80 per cent in Toronto.

In past years, a major development in the promotion and acceptance of alternative work schedules has occurred. Newspaper and television advertisements have resulted in a public awareness of the benefits alternative work schedules have to offer. Energy and cost savings, quicker trips to work, and more efficient utilization of transit can make the switch to alternative work schedules worthwhile.

Smarty's Smarts



It's metric time, Smarty!

Ottawa - Carleton

The Regional Municipality of Ottawa-Carleton has recently completed a Transportation Energy Management Study in order to determine measures with which municipalities can increase their transportation energy efficiency.

As part of this study, three separate reports and an Executive Summary were prepared:

- a conservation report, consisting of recommended measures to reduce transportation energy consumption in the region;
- a contingency report, including recommended measures to be implemented in the event of an energy shortage;
- an energy data base with which the energy impacts of various transportation related projects can be measured.

During the research for the conservation report, a large number of possible energy measures were researched and evaluated. From these, the more promising measures were selected and subjected to a more detailed analysis. The analysis showed the following were most effective in the areas of energy savings, cost-effectiveness, safety, and potential use as part of a contingency plan:

- traffic engineering measures, such as improved network timing plans, more frequent timing plan updates, pedestrian and vehicle actuated signals, replacement of four-way stops;
- alternative work schedules;
- ride-sharing;
- fringe parking facilities;
- driver training;
- fleet management and maintenance, and use of alternative fuels.

The focus of the contingency report is somewhat different than that of the conservation plan. Its purpose is to provide a framework from which a detailed plan may be developed in order to ensure that essential activities will be maintained in the event of a fuel shortage.

The study concludes that if municipal contingency action is to be effective, it is essential that municipal contingency plans be co-ordinated with those of other levels of government. An energy shortage is more likely to be felt over larger regions of the country than in just one municipality.

The energy data base examines a framework which could provide a means for evaluating the energy ranking of transportation related projects. A series of work sheets were developed to assist in this evaluation and ranking, and to compare energy impacts between various transportation projects.

The study is summarized in an Executive Summary which condenses the results of the report and identifies further activities that could be undertaken in implementing the Conservation Plan and in detailing the Contingency Plan.

Copies of this study can be obtained by contacting:
Mr. Louis Shallal, (613) 563-2792
Regional Municipality of Ottawa-Carleton
222 Queen Street, 11th Floor
Ottawa, Ontario K1P 5Z3

Energy Efficiency in Transit Buildings

Measures to minimize building utility costs are the focus of a recent report from the City of Seattle which includes input from various cities such as Ottawa and Toronto.

New transit buildings can incorporate energy-saving features right into their design and can therefore operate at a 60 per cent higher efficiency rate than older facilities. These features include:

- a large southern exposure,
- maximization of solar energy,
- building envelopes that minimize heat loss.

Many new facilities are being constructed with an internal circulation system. This involves the installation of both entrance and exit doors on the same side of the building. Inspection and service lanes, maintenance and storage areas are placed in the centre of the facility. This floorplan eliminates the wind tunnel effect which occurs when doors are open at opposite ends of a building. However, internal circulation does have some drawbacks. As the buses are being driven for longer periods of time inside the facility, they are also emitting more diesel fumes. This can cause a residue deposit on walls and ceiling which creates a maintenance problem.

Heating, ventilation and air-conditioning (HVAC) systems account for 75 per cent of all energy used in transit buildings. One of the simplest ways to reduce this cost is to turn thermostats back to 20°C (68°F) in the winter and 22°C (72°F) in the summer. Setback thermostats with tamperproof covers can reduce heating bills from 10 per cent to 20 per cent, by reducing temperatures in an unoccupied building.

Heat recovery systems can be installed to further eliminate HVAC waste by using pure heated air to either heat or cool a building. Examples of such systems include: air-to-air heat exchangers, energy cascading, heat wheels and run-around loops.

Heat loss through the building envelope can greatly diminish HVAC efficiency. While heat retention can be improved by weather stripping, caulking and insulating, much of the heat still escapes through open doorways. This loss can be reduced through various devices.

Air curtains best reduce heat loss through heavily travelled bus entrances and exits, as they allow the bus unobstructed passage into a building. Magnetic loop doors are better suited for moderately travelled doorways.

Lighting is the second largest user of energy in a transit agency. Costs can be greatly reduced in this area merely by switching to high efficiency lighting and by turning off unnecessary lights.

Fluorescent lights are not appropriate for the majority of areas in a transit building as too many must be installed to provide adequate lighting. High pressure sodium lights have a tremendous efficiency rate that doesn't fluctuate with temperature changes and are therefore suitable for bus storage and parking areas. Metal halide lights should be installed in maintenance shops as the white light they cast has good colour retention qualities.

Hot water efficiency can be improved by reducing domestic hot water temperature settings to 90°C and by insulating hot water pipes and storage tanks. To further eliminate hot water waste, transit agencies may want to consider using cold water instead of hot to wash their fleet.

Aside from traditional energy projects, there are some recent innovations that can help transit agencies conserve energy:

- install energy management computer systems to control and monitor energy use,
- generate electricity with chassis dynamometers.

An energy management system is a computer system that controls and monitors equipment. It can be used for energy monitoring, start/stop scheduling and for duty cycling.

A very novel idea is to install chassis dynamometers in new buildings to generate electricity. As a bus's rear wheels turn the dynamometer cylinder, the dynamometer's motor acts as an electric generator and feeds electricity back into the building's power grid. The electric savings can be substantial. If a shop uses a 150 hp dynamometer for two hours a day, it can generate 51 000 kW hours of electricity in a year's time. This could save $2,550 to $6,000 a year depending on local utility rates.

Energy prices have been increasing at a rate of 10 per cent to 15 per cent a year. If transit managers do not pay attention to energy costs now, they will be forced to pay more for utility bills in future, and consequently will have less to spend on new equipment and driver training.

Malvern's newest bus garage incorporates many of these energy-saving measures.

SSTOP GETS GREEN LIGHT...

The Signal System Optimization Program (SSTOP) is the result of a combined effort at conservation by Transport Canada, the Ministry of Transportation and Communications, and Metro Toronto. SSTOP is a computer program, designed to provide smoother traffic flow by evaluating and co-ordinating traffic signals to reduce unnecessary intersection stops and delays. Fuel consumption is therefore reduced as vehicle deceleration, acceleration and idling is decreased.

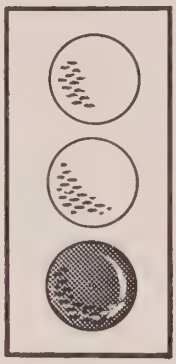
The calculations for this computer program are based on several variables:

- the average number of vehicles at a particular intersection,
- the length of time required to travel between intersections,
- the direction in which vehicles proceed from the intersection,
- the number of approaches at the intersection,
- the types of vehicles at the intersection.

The data for each individual intersection are then processed by the computer and traffic signal timing plans are produced.

SSTOP was implemented in the Brantford, Durham and Kitchener-Waterloo Regions as part of the Municipal Traffic Control System (MTCS) project. MTCS was developed in order to demonstrate the viability of a standard, off-the-shelf system for traffic control in municipalities with populations between 50,000 and 350,000.

A program with many marketable features, SSTOP is able to estimate fuel consumption and produce time-space diagrams to show optimal traffic flow patterns. It can also produce short-term traffic plans, such as extending amber lights during slippery road conditions, and adjusting traffic patterns to accommodate the heavy rush of vehicles exiting from a high attendance event.



Seminars for SSTOP users have been held in many municipalities in Ontario and more are being planned.

For further information about SSTOP, please contact:
Mr. J. McGill
Ontario Ministry of Transportation and Communications
Traffic Management and Engineering Office
Room 236, Central Building
1201 Wilson Avenue
Downsview, Ontario M3M 1J8
(416) 248-3781

Municipal Action

The Municipality of Metropolitan Toronto has now completed Phase II of the Metropolitan Toronto Area Transportation Energy Study (MTATES). Phase I, completed in 1980, examined energy intensities by transportation modes and type of land use.

Phase II, completed in 1984, involves the development of procedures and/or measures that could be implemented by Metropolitan Toronto in order to conserve energy.

The study deals with three different aspects of transportation efficiency:

- fuel conservation measures, such as traffic signal timing co-ordination modifications and intersection improvements;
- analysis of land-use patterns and densities which can significantly influence long-term travel volumes;
- key elements of a fuel shortage contingency plan.

The results of the study will be presented in more detail in a future newsletter.

Editor's Note: The previous issue of this newsletter, July 1984, was incorrectly numbered Vol.3 No. 3 instead of No.2. We apologize for the resulting confusion and ask that you change the number on the previous issue to Vol.3 No.2.

If you'd like to receive this newsletter, or know someone who would, please fill out this form and mail it to:

Frank Cherutti
Executive Secretary
MTEAC
3rd Floor, Central Building
1201 Wilson Ave.
Downsview, Ont.
M3M 1J8
(416) 248-7296

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The MTEAC newsletter is a publication of the Transportation Energy Management Program (TEMP), produced by the Ministry of Transportation and Communications in cooperation with the Ministry of Energy.

Ontario
Ministry of Transportation and Communications
Hon. James W. Snow
Minister

Ministry of Energy
Hon. Philip Andrewes
Minister

ISSN 0226-9384

Energy Ontario

TRANSPORTATION ENERGY NEWSLETTER

MTEAC

DEC. 1984

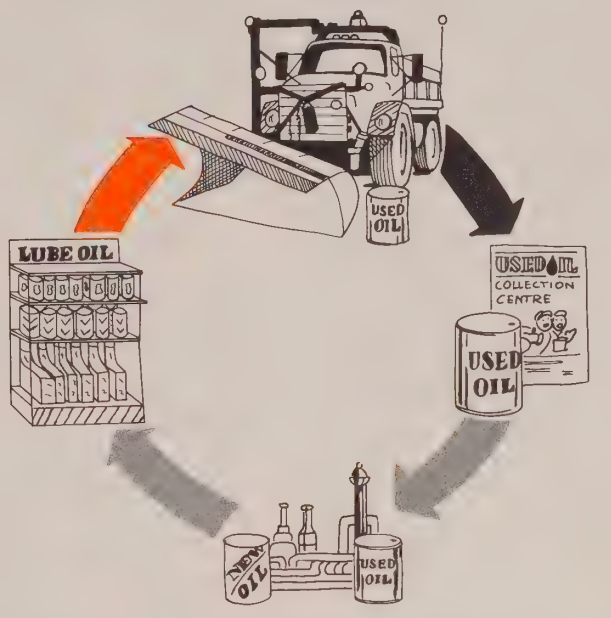
MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES, AND THE PROVINCE OF ONTARIO

VOL. 3 NO. 4

Recycling Used Lube Oil

As oil prices and supplies become less certain, Canadians are searching for ways to conserve non-renewable resources. They are also becoming increasingly aware of the environmental problems caused by disposing of society's wastes.

Recycling used lube oil helps to conserve oil resources and reduce environmental pollution. However, at present, most of this reusable resource is dumped into sewers, poured onto the ground, or mixed with municipal garbage. Used lube oil has the potential to be an indigenous renewable resource, but there should be a more responsible attitude toward resource conservation.



Oil in the Environment

Private vehicles, small fleets, commercial trucking and delivery firms represent the largest source of spent lube oil, yet returns from these areas are minimal. The majority of their lube oil ends up in landfill sites, sewers, and private backyards.

This indiscriminate dumping is hazardous to the environment. Although used oil on the surface is easily biodegraded because of the oxygen in the atmosphere, oil that seeps below the surface can last for hundreds of years. Eventually, the oil can reach the watertable where its contaminants dissolve and possibly disperse into vegetation, animal life, and drinking water. All levels of the food chain can be affected, micro-organisms and people alike.

An Alternative

Spent lube oil can be recycled to yield a useful product. Currently, recovered oil is reused as a dust suppressant on dirt roads, fuel for industrial processing, re-refined lubricant, and yes, even as a spray to protect pigs from sunburn! However, both burning used oil and road oiling are discouraged by Environment Canada because of the risk of disturbing the natural balance of the ecosystem.

Of these options for used oil, reuse as a lubricant is the most favoured from an energy, environmental and economic point of view. As an industrial fuel or dust retardant, recovered oil can be reused only once. In contrast, there is no limit to the number of times used oil can be re-refined and reused as a lubricant.

The Recycling Industry

Although the necessary technology for recycling oil has been available in Canada since World War II, it was not until the mid to late 1970s that oil re-refining emerged as a viable industry. Currently, there are two major re-refineries in Ontario: Breslube and Canadian Oil. Together, they have the capacity to recycle about 100 million litres of lube oil per year.

To collect used oil, the recyclers send trucks to service stations, collection depots, shipyards, factories, and airline and railway terminals. Following an analysis to determine the degree of contamination, acceptable used oil is put through the re-refining process: demetallization, filtration, distillation, and

Continued on page 2

(continued from page 1)

hydrotreating. Approximately 30 per cent of the original volume is lost during re-refining. However, recycling is a worthwhile effort because refined motor oil is of the same or better quality as virgin motor oil.

Used Oil Recovery Programs in Ontario

Today, 99 per cent of the waste oil supplied to the re-refineries comes from major service stations, large vehicle fleets and heavy industrial users. However, private vehicles and smaller fleets represent an even greater potential source.

The first recycling program, aimed at the general public of Ottawa, asked voluntary participants to deposit used oil at specific drop-off centres. Based on this idea, a pilot program was initiated in 1979 in the Kitchener-Waterloo area where service stations acted as depots for the public's used oil. There was no money transaction between the station and the participant; however, the service station received 8-11¢/L from the re-refinery. Used oil collected during the two-year program totalled 7282 L in 1979 and 12 072 L in 1980.

Currently, the City of Kitchener is trying another approach. Used oil is being collected weekly along with other recyclable materials placed at the curbside. Curbside collection is hoped to be the answer to greater participation.

Several other municipalities have similar programs underway. Halton is in the process of developing a used oil collection program based, in part, on the Kitchener system, while in Peel Region, the public sector is asked to deposit its used oil in one of two 1135 L collection drums. The Scarborough program has been in operation for several years and consists of one depot with a 4540 L in-ground storage tank. The money gained from the used oil is used to fund the multi-material recycling project that recovers glass, metals, and newspapers within the municipality.

The Federal government, through Environment Canada, has a recycling program too. In the Greater Toronto area, 400 waste oil collection depots have been established. These centres can be identified by a triangular logo (shown on this page). Currently, this program is being expanded to include the regions of Hamilton-Wentworth and Niagara, and eventually all of Canada.

National Oil Recovery logo

Kitchener Waterloo logo

Benefits of Recycling Used Oil

Conserving waste oil through recycling is advantageous in a number of ways:

1. *Protection for the environment* – Any increase in re-refining means a proportional decrease in used oil dumping. This, in turn, would decrease the amount of lead, PCB's and other contaminants deposited into the environment through dumping used oil.
2. *Reduction in Imported Crude Oil* – Re-refined lube oil represents a renewable resource for Ontario. Consumption of lube oil would decrease as our supply is continually re-used and, as a result, our demand for imported oil would ultimately be reduced.
3. *Intelligent Use of a Valuable Resource* – Recycling means conserving resources for future generations. Re-refining used oil would make Canadian oil fields last longer.
4. *Investment in a Healthier Economy* – A large re-refining operation in Ontario would mean less importing of lube oils and thus, more money within the province. Jobs would also be created in the collection and recycling industries.

A used oil recovery program makes good sense. The only limits to increased oil recycling are to find better ways to collect waste oil and encourage people to participate. Overcoming these obstacles would lead to successful waste oil recycling – a concept that would help to improve our environment and economy.

For more information about used oil recycling, contact:

Ministry of Transportation and Communications
TEMP Office
3rd Floor, Central Building
1201 Wilson Ave.
Downsview, Ontario
M3M 1J8
(416) 248-7191

Mr. Jack Marshall, Canadian Oil, Toronto at (416) 461-7511.

Mr. Frank Wagner, Breslube-CanAm, Breslau (Kitchener) at (519) 648-2291.

MTATES PHASE II NOW COMPLETED

Phase II of the Metro Toronto Area Transportation Energy Study (MTATES) has recently been completed. This phase was produced by Metro Toronto, the Toronto Transit Commission, and the Transportation Energy Management Program (TEMP), a joint program of the Ministries of Transportation and Communications and Energy.

MTATES has been undertaken in two phases. Phase I, completed in December 1980, examined future energy scenarios and energy intensities by transportation mode and land use. Phase II involved the development of energy conservation strategies that could be implemented by Metro. Three background reports analyze these strategies:

1. Short-term Transportation Energy Conservation Measures
2. Energy Conservation through Transportation Land Use
3. A Contingency Plan Strategy.

The study's findings are documented in a summary report.

Conservation Measures

A profile of transportation energy consumption revealed that 2.8 billion litres of gasoline are consumed annually in Metro Toronto. Of this total, approximately 96.5 per cent is consumed on the road system, while the transit system accounts for only 3.5 per cent. It was also found that delays at traffic signals account for 31.9 per cent of the total areawide energy consumption.

Based on this profile, it was clear that conservation strategies should be focused on the roadway system and, in particular, the traffic signal system. The principle objective was to select cost-effective measures which would yield high energy savings at various locales.

To achieve this objective, the study team considered some 90 conservation measures for possible implementation. This long list of measures was prescreened to eliminate measures not applicable to Metro and to highlight those measures which could be implemented immediately. After a detailed assessment, the following three measures were recommended to be implemented and monitored in 1983:

1. computer optimized signal timing;
2. semi-actuated signal control; and
3. variable signal phasing throughout the day.

According to MTATES phase II, these three measures have the potential to save 3.5 per cent of Metro's total annual transportation energy consumption. That savings represents over 100 million litres of gasoline per year and a cost saving of about $45 million per year to the travelling public.

The assessment also resulted in the identification of 61 measures as possible candidates for implementation in 1984-87. Among these, twelve measures were found to have the potential to save 70 million litres of gasoline annually. The following table shows each measure and its fuel saving capacity.

Transportation/Land Use Planning

The study team concluded that the opportunities for major changes in land use patterns are limited in Metro Toronto because most of the land has already been developed. However, the current land use planning approaches of Metro Toronto and surrounding municipalities are generally consistent with the principles of energy conservation.

A method for estimating energy consumption related to employment and residential locations was derived from Metro's current travel patterns. It was found that the average commuting trip consumes about 1.43 L per employee travelling one way or 660 L per year.

A review of the Metropolitan Official Plan (Metroplan) revealed that changes could be made to encourage more energy efficient development patterns. Consequently, the study team recommended that the following propositions be considered:

- designation of major centres in northern Etobicoke and on the Spadina subway route; and
- creation of employment opportunities in north-west Metro and areas west of Yonge Street.

(continued on page 4)

MEASURES PROPOSED FOR IMPLEMENTATION (1984-87)

Rank	Category	No. of Applications	Start-up costs	Savings (L/Yr)**
1	Replace unnecessary all-way stops with: a) 2-way or 1-way stops	670	$3,430,000	27,000,000
	b) Traffic Lights	75	3,040,000	2,740,000
2	Reduce speed limits by 10 km/h on all freeways	123 km of road	147,850	15,700,000
3*	Carpool matching program	20,000 per day	477,000	10,840,000
4	Implement 1-way street plan to increase capacity	5 road pairs	2,516,500	4,740,000
5	a) Left turn restriction	72	52,500	1,800,000
	b) Split green phasing	100	230,000	875,000
6	Remove curb parking in peak periods	43 km of road	48,000	1,260,000
7*	Express bus service	27 routes	25,000	1,090,000
8*	Variable work hours	4,000 employees	0	450,000
	TOTALS		$9,966,850	66,495,000

* These measures require additional operating costs.

** Assuming measures are fully implemented throughout Metro.

Source: MTATES PHASE II, Summary, March 1984.

The MTEAC newsletter is a publication of the Transportation Energy Management Program (TEMP), produced by the Ministry of Transportation and Communications in cooperation with the Ministry of Energy.

(continued from page 3)

Contingency Plan Strategy

This part of the study develops a framework for a plan of action in the event of a fuel shortage. Based on a range of potential fuel shortages (5 per cent, 10-15 per cent, and 20-25 per cent reduction), losses in mobility and mobility replacement measures were identified. The following four measures were selected as key elements of the contingency plan:

- modification of travel demand;
- promotion of ridesharing;
- extension of transit service; and
- modification of traffic operations and controls.

The Contingency Plan study also proposes the designation of a co-ordinator who would monitor the detailed planning stage and oversee implementation. Specific actions and responsibilities to be undertaken during an energy shortfall are also outlined in the background report.

Summary

Phase II has demonstrated that Metro Toronto can significantly influence transportation energy use. Monitoring of the modified traffic signal system has confirmed that the measures already implemented are significant energy savers. The report's findings on land use planning reveal that Metro's urban structure can be gradually changed to yield more transportation energy efficient patterns. Furthermore, the proposed contingency plan could allow Metro to overcome even the most critical fuel shortage.

The coming years and decades will inevitably bring changes in the energy supply and demand scenario. Certainly, the application of MTATES' recommendations will place Metro Toronto in a much better position to accommodate the future.

Ontario
Ministry of Transportation and Communications
Hon. James W. Snow
Minister

Ministry of Energy
Hon. Philip Andrewes
Minister

Municipal Action

Metro Receives Conservation Award

Metro Toronto is the first recipient of the Transportation Energy Conservation Award presented by the Institute of Transportation Engineers in memory of Frederick A. Wagner. The award is to be given annually to the individual, firm, institution, or municipality which, in the opinion of the Institute, makes the most significant effort to promote energy conservation in the transportation field.

The award is in recognition of Metro's five-year program to improve the traffic signal system. This program, emanating from the TEMP sponsored Metro Toronto Area Transportation Energy Study (MTATES), has the potential to reduce areawide gasoline consumption by about 100 million litres or 3.5 per cent annually.

The award was presented at the Institute's 54th Annual meeting in San Francisco this September. Representing Metro were Mr. A.R. Gordon, Director of the Transportation Division, Planning Department and chairman of the MTATES steering committee, and Mr. L. Rach, Director of the Traffic Engineering Branch, Roads and Traffic Department.

Let's Hear From You!

Since its inception in February 1980, MTEAC has provided Ontario's municipalities with perspectives on the rapidly changing energy situation. This newsletter, one project of the committee, informs municipalities, engineers, planners, and elected officials about transportation energy management programs and measures.

MTEAC's original intention for the newsletter was to provide a pool of information from various Ontario sources. To uphold this objective, we would like to present more information directly from the municipalities.

If your municipality has implemented energy conservation measures, whether they have been successful or not, please share them with other municipalities so they can benefit from your experience. We would also welcome news on innovative conservation measures, or interesting ideas you or someone in your organization might have developed.

To continue to provide relevant information, we need feedback from our readers. Comments on the following would be appreciated:

- relevance of the articles and the newsletter as a whole;
- length and readability; and
- subject matter and depth.

Your contributions and suggestions are necessary for publishing a successful MTEAC newsletter. We are looking forward to hearing your ideas and incorporating them into future issues.

If you'd like to receive this newsletter, or know someone who would, please fill out this form and mail it to:

Frank Cherutti
Executive Secretary
MTEAC
3rd Floor, Central Building
1201 Wilson Ave.
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This issue was written by Diane Wilhelm.

ISSN 0226-9384

Energy Ontario

TRANSPORTATION ENERGY NEWSLETTER

MTEAC

MARCH 1985

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES, AND THE PROVINCE OF ONTARIO

VOL. 4 NO. 1

Streetlighting: "Sodium Luminaires Outshine the Rest"

In this period of heavy budget restraints, municipal officials are searching for ways to reduce spending without sacrificing the quality or quantity of services they offer. One way of achieving this paradoxical goal can be found in the municipal street lighting system. Numerous test cases have proven that high and low pressure sodium lamp systems can lead to a considerable reduction in energy consumption and resulting dollar expenditure. These dollar savings are compounded by reduced maintenance requirements and a more powerful lighting system.

Low and high pressure sodium lamps are better than any other lighting form in terms of energy effectiveness in their output in lumens per Watt, (lm/W).

Streetlighting in a mixed residential/commercial area.

Light Source Characteristics

Lamp Type	*Efficiency 1 lm/W*	*Lamp Life 2 Hours*	*Colour Quality*
Incandescent	15-20	2500	very good
Fluorescent	40-60	9000-20 000	good
Clear Mercury	40-50	24 000	poor
Colour Corr. Mercury	40-50	2400	fair
Metal Halide	65-90	7500-15 000	good
Low Pressure Sodium	90-160	18 000	very poor
High Pressure Sodium	60-110	24 000	fair

1 Wattage of Ballast included.
2 Life Length is Based on 50% Mortality, 10 Hours Per Start.

This chart shows *light source* characteristics, not *luminaire* characteristics. However, a luminaire that has a more efficient light source is a more efficient luminaire.

High Visibility

One of the most important factors to consider when converting or replacing street lighting is the overall light requirements of the area. While low pressure sodium lights are excellent for highway lighting, in some cases they have been found to be aesthetically unacceptable in commercial downtown areas. This is because LPS is a monochromatic source, meaning that it contains only one colour, yellow. The yellow hue often causes the illuminated objects to appear as different shades of grey.

An additional problem with the LPS lamp, as with the fluorescent tube, is its large size. Because of this, utilizing light output efficiently can be difficult due to light spillage, the technical term for light that is difficult to control and direct to a specific area. Where light spillage and colour rendition are not important, low pressure sodium lamps are a very attractive option because of their effective light output.

High Pressure Sodium Best Choice

HPS lights are considered the best all-round source for street lighting. The quality of the colour is good, and the area of the light can be precisely directed and controlled. HPS lights also have a long lamp life, equivalent to that of mercury vapour, which will reduce maintenance and inventory costs.

One problem with HPS lamps is the glare sometimes caused by their high source brightness. This problem can be solved by mounting the luminaires at the proper height and by careful selection of the light distribution pattern.

Continued on page 2

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Streetlighting, continued

In a joint project in 1978, Ontario Hydro and the Ontario Ministry of Transportation and Communications conducted a study in two cities, Belleville and Woodstock. Their aim was to see if a conversion to sodium lighting would be cost efficient and practical. The conversion followed a "new lamps for old" principle in that no poles or bracket arms were changed. The mounting height and spacing also stayed the same as it had been with the original lighting system. All the streets involved had lighting on one side only.

Excellent Results in Belleville and Woodstock

The study showed that average illuminance values can be increased by changing incandescent or fluorescent street lighting to more efficient sodium sources. Electricity savings ranged from 25 to 74 percent.

Cost Analysis

Before changing its street lighting a municipality should consider a cost analysis to ensure that it is worthwhile to replace or convert its existing system. This analysis could investigate such things as design, the cost of installation, maintenance, operations, and the life-cycle costs of the system. In some cases, it might not be cost effective for a municipality to convert or replace its current street lighting. For other municipalities, the change to an energy-efficient sodium lighting system may put them on the road to economic and energy conservation.

Municipal Examples

Where cost effectiveness analyses indicated conversion or replacement of systems to luminaires using low or high pressure sodium lamps, the outcome for the municipalities involved has been laudable. Between 1978 and 1980, the City of Quebec converted its lighting system to high pressure sodium lights with considerable success. Where sodium luminaires had replaced incandescent lights, a 45 percent increase in the illumination level of street lighting was achieved. In all, the City of Quebec increased its level of street lighting, reduced its power consumption by 23 percent, and reduced its lighting expenditures by 40 percent.

The City of Windsor is another municipality where conversion to sodium luminaires was beneficial. Windsor undertook a mass refixturing from incandescent to high pressure sodium lighting. The cost of the refixturing was $820 000, with a projected first year savings of $167 740. Mercury vapour lighting is also gradually being replaced with HPS, at a cost of $2 020 948 and a projected first year savings of $294 264. Although it will take slightly longer for the HPS lights to start paying back, leaving the conversion of the mercury lamps to the future would prove to be more expensive because of the rising cost of the lamps.

Further Considerations

Two further considerations for a municipality are electricity costs and the current rate of inflation. When power costs are relatively low, the need for replacement to a more efficient system is not so pressing. However, if electricity costs continue to rise, perhaps savings could be obtained by converting to a more cost efficient mode of lighting. Consideration of the inflation rate could lead to a similar decision concerning conversion or replacement. Since inflation affects labour costs, depending on the rate of inflation, some municipalities might find a savings in maintenance and operations costs if they were to switch to a more efficient and longlasting form of lighting.

Municipalities that have analyzed the costs, and converted to sodium lighting have found significant savings in both energy and money. The lights have proven popular with the public, for it has been shown by many studies in the past that improved levels of street lighting result in decreases in traffic accidents.

Generally, the problems with sodium lights are few and outweighed by their advantages in energy efficiency, increased levels of street lighting, reduced power consumption and overall costs. With these plusses in their favour, sodium lighting systems "outshine" other lighting forms and are a simple, yet progressive step towards successful energy conservation and municipal cost cutting.

Sodium Energy Savings

BELLEVILLE

	Lighting Before	*Lighting After*	*Energy Savings*
Street One	2 x 60 W Fluorescent	70 W HPS Type 11 M NCO	HPS uses 45% less electricity than fluorescent
Street Two	2 x 60 W Fluorescent	55 W LPS Type 1V M NCO	LPS uses 50% less electricity than fluorescent
Street Three	2 x 60 W Fluorescent	100 W HPS Type 11 M SCO	HPS uses 25% less electricity than fluorescent
Street Four	2 x 60 W Fluorescent	90 W LPS Type 1V M NCO	LPS uses 25% less electricity than fluorescent

WOODSTOCK

	Lighting Before	*Lighting After*	*Energy Savings*
Street One	500 W Incandescent	100 W HPS Type 111 M SCO	HPS uses 74% less electricity than incandescent.
Street Two	300 W Incandescent	70 W HPS Type 11 M NCO	HPS uses 68% less electricity than incandescent.
Street Three	300 W Incandescent	70 W HPS (Conversion Kit) Type 11	HPS uses 68% less electricity than incandescent.

SCO = Semi Cut Off NCO = Non Cut Off M = Medium

PROPANE
AN ATTRACTIVE ALTERNATIVE FOR FLEETS

Higher gasoline prices have Canadians searching for alternative transportation fuels to replace conventional energy means. The first, and most popular, alternative fuel to gain wide acceptance and usage for transportation purposes has been propane. A recent survey directed by the Drive Propane and Municipal sections of the Transportation Energy Management Program was conducted to determine the number of propane-powered vehicles in municipal fleets and to compare their performance to equivalent gasoline-powered vehicles.

In order to gather this information, 91 municipalities were contacted and asked to complete a questionnaire detailing their involvement with propane.

One of a number of propane-fueled garbage trucks in the City of North York. By 1987 North York hopes to have all vehicles under 15 000 kg GVW converted to propane.

The Questionnaire

The questionnaire was given only to municipalities with a population in excess of 25 000. Of the 91 municipalities contacted, 84 responded, giving a response rate of 92 percent. The questionnaire consisted of two sections, the first of which was geared towards municipalities who already have propane-fuelled vehicles in their fleets. This section was interested in finding:

a) the number and type of propane-fuelled vehicles;
b) the distance traveled by each vehicle type;
c) the savings/costs compared to gasoline;
d) the municipality's plans to increase their propane fleet; and
e) the type of vehicles to be converted.

The second part of the questionnaire was directed towards municipalities whose fleets are without propane-fueled vehicles. This section was aimed at discovering whether or not propane had been considered as an alternative to gasoline-powered vehicles, and if so, to find out for what reasons propane had been rejected.

Findings

The findings from the questionnaire were both informative and generally positive.

Fleets ranging in size from 1 to 100 vehicles

Total no. of vehicles	*1220*
Cars	366
Trucks (including pickups & vans)	684
Heavy Trucks	170

Over 70 percent of the municipalities surveyed reported having at least one propane-fuelled vehicle. These municipalities indicated that they were pleased with the performance of their vehicles, with 68 percent planning to increase the size of their fleets. Some of these municipalities encountered problems such as occasional cold weather starting and fuel availability; however, it was the consensus overall by the 59 municipalities using propane-fuelled vehicles that the benefits of propane far outweighed the problems. It was further indicated by these municipalities that propane vehicle performance compared very well to that of similar gasoline-powered vehicles. In fact, cost savings of up to 50 percent were reported in some cases.

Fuel cost savings
Gasoline to Propane

Cars	32.8%
Light Trucks	24.1%

Although the savings for trucks are less than the savings for propane-fuelled cars, 95 percent of the municipalities planning to increase the size of their fleets stated that they would increase the number of vehicles in the light-truck category for propane use.

Benefits Vs. Problems

Of the 84 municipalities surveyed, 25 do not have propane vehicles. Seventeen of these 25 municipalities considered using propane in the past, but have not converted because they felt the fuel was not suitable. The following is a list of statements from 25 of the 84 municipalities who do not currently have propane-powered vehicles.

continued on page 4

(continued from page 3)

Propane

These municipalities:

- stated availability of the fuel would be a problem;
- believe their current vehicles are not suitable for conversion to propane;
- believe their drivers would not accept the fuel.

Although some municipal fleets are not suited for propane conversion, many of the other "problems" with propane can be easily solved. For example, anticipated "availability" becomes progressively less and less a problem with new propane stations appearing in even the most isolated areas.

A respondent from one municipality, speaking about equipment problems, suggested that, "the majority of people who have adverse comments will not take the time to see that the installations are done properly".

Lack of driver training, and awareness problems could be resolved through brief information seminars for municipal fleet drivers. Demonstrations of the ease and simplicity of propane driving could alleviate the hesitancy towards propane that some drivers feel.

Municipalities who have converted to propane-fuelled vehicles utilize them for numerous functions. Propane powers ambulances, police cars, and works department vehicles as well as buses and garbage trucks. There are 60 000 propane-fuelled vehicles on the road today in Ontario, and approximately 1400 fuelling stations. Propane has rightfully gained popularity due to its reduction of maintenance and improvement in fuel economy.

Conclusion

Propane as a transportation fuel has been used in Ontario for nearly five years. Over this time period, propane has proven to be a viable alternative to gasoline as a transportation fuel.

Ontario

Ministry of Transportation and Communications
Hon. George McCague
Minister

Ministry of Energy
Hon. George Ashe
Minister

Various propane publications available through Transportation Energy Management Program.

MUNICIPAL ACTION

Municipal Fleet Management Information System Sudbury Update

The Municipal Fleet Management Information System, currently being introduced in Sudbury, involves energy conservation practices associated with implementing, monitoring and reporting on a vehicle maintenance recording system using microcomputers. The design phase of the Sudbury Municipal Fleet Management System was modified and is now completed. The system has been put through theoretical trials to test the software which will be compatible with a number of microcomputer systems. The program has also been through a debugging exercise to eliminate any problems remaining in the program.

In the future, this software package will be useful to municipalities, with a fleet of approximately fifty vehicles or more, who desire to improve productivity. A series of five or six demonstration workshops will be held across Ontario to promote this system.

The Municipal Fleet Management System in Sudbury is due to be completed in July of this year.

If you'd like to receive this newsletter, or know someone who would, please fill out this form and mail it to:

Frank Cherutti
Executive Secretary
MTEAC
3rd Floor, Central Building
1201 Wilson Ave.
Downsview, Ont.
M3M 1J8
(416) 248-7296

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This issue was written by Jinnean Barnard.

ISSN 0226-9384

Energy Ontario

TRANSPORTATION ENERGY NEWSLETTER

MTEAC

JUNE 1985

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES AND THE PROVINCE OF ONTARIO

VOL. 4 NO. 2

Transportation Energy Supply and Consumption 1985

The first issue of the MTEAC newsletter (Vol. 1, No. 1), published in February 1981, dealt with energy supply and consumption. Four years have passed since that first discussion, and during that time the energy situation has changed considerably. We are currently experiencing a lull in fuel prices and a moderate upswing in the economy. Stemming from these conditions, the provincial energy situation has changed from one characterized by escalating prices to one of moderately declining prices. Because of this fluctuation in energy costs, the following is a comparison of transportation energy supply and demand from 1981 to 1985 and some possibilities for the future.

Fossil fuel storage area.

Past

Canada in 1981

- Security of crude oil supply was Canada's number one energy problem.
- Canada imported 25 per cent of its crude oil supply.
- Canada had an increasingly vulnerable oil supply.

Ontario in 1980

- Oil was Ontario's major source of energy; almost all of it came from outside the province.
- In Ontario, 50 per cent of the total petroleum consumption occurred in the transportation sector. Thirty-five per cent was consumed by private vehicles.
- Demand for motor gasoline was about 12.9 billion litres, while the demand for diesel fuel was approximately 2.35 billion litres.
- The number of registered vehicles in the province was 5 168 422.

Present

Canada in 1985

- Canada still relies heavily on oil, but its total use of oil has decreased, and there is still room for continued substitution.

Ontario in 1985

- Since 1980 Ontario's total energy demand has decreased by 4.6 per cent. Although the decrease can be explained partially by the recession, it can also be attributed to an increased awareness of Ontarians, who are striving to conserve energy.
- The transportation sector now consumes approximately 70 per cent of total petroleum consumption.
- Demand for motor gasoline has declined by about one per cent since 1980 to 11.8 billion litres, while the demand for diesel fuel has increased by eight per cent to 2.56 billion litres.
- The number of registered vehicles in the province has increased by approximately 29.5 per cent to 7 330 727.
- The GNP (1971 base year) has gone from $\$45{,}938 \times 10^6$ in 1980 to $\$47{,}406 \times 10^6$ in 1984, an increase of 3.2 per cent.

Energy and the Future

World Oil Market

- Current soft oil demand and stable prices are no cause for complacency. Reducing energy cost is still a potent way to contribute bottom line dollars.
- OPEC countries have increased their share of world reserves, rising from 65.3 per cent in 183 to 68.2 in 1985. Thus, OPEC's influence on the oil economy is likely to increase substantially by 1990.

Continued on page 2

(continued from page 1)

- The result of OPEC's determination to maintain the market price at $29/barrel, while spot prices fell, was a reduction in the demand for OPEC oil. At the same time consumption increased 2.7 per cent in the OCED countries for all of 1984.
- Markets have firmed significantly since the January 1985 OPEC meeting in Geneva at which the price for Saudi Light, now abandoned as the benchmark, fell to $28/barrel.
- Every region except the Middle East and the eastern block countries saw production at higher levels in 1984, resulting in downward pressure on prices.

Canadian Market

- Effects of the Western Accord on transportation fuels depend on the Canadian price trends over the coming years.
- In the short-term there should be a marginal decrease in crude oil prices due to New Oil Reference Price (NORP) declines and Canadian Old Oil Price (COOP) increases to world price. Toronto Refinery Acquisition Cost (TRAC) may decline by $1-2/barrel. However, refiners may maintain prices to recover lost margins and not pass on savings.

Although there has been some headway in moving from oil to alternative sources of energy, oil still remains the predominant transportation fuel and will continue to do so unless a major breakthrough develops in electric- or hydrogen-powered vehicles or some other alternative fuel.

Changes to the ratio of fuel types consumed should come as oil becomes increasingly expensive and insecure as an energy source and as alternative fuel technologies and economics improve. Development of alternative sources such as propane, natural gas, methanol, hydrogen, and electricity are important to the future of a stable transportation sector in Ontario and Canada as a whole.

The transportation sector now consumes approximately 70 per cent of total petroleum consumption.

Chairman's Message

Louis Shallal, P. Eng., Ph.D.

It is pleasing to note that over the past few years there has been increased awareness and appreciation for the need to conserve energy, particularly in the transportation sector. Transportation engineers and planners are in the forefront, diligently working at all levels of government and the private sector to ensure energy-efficient solutions are found to our day-to-day engineering problems.

Municipal transportation programs, which deal with energy conservation and management through a variety of actions, including improved traffic operations, better transit service, ride-sharing, and fleet management, have been initiated throughout the province of Ontario.

We, in the Municipal Transportation Energy Advisory Committee (MTEAC), look forward in the coming year to making significant progress on a number of goals. These include:

1. the promotion of the Fleet Information System for which the Sudbury demonstration will be finalized July 30;
2. the promotion and marketing of the concepts presented in the Transportation Energy Analysis Manual (TEAM) and the continuous monitoring and evaluation of its usefulness;
3. the examination of the transportation energy issues facing rural Ontario municipalities; and
4. the emphasis on actual implementation of feasible solutions to some of our transportation energy problems as opposed to studies. The varying and diversified expertise of the MTEAC members will ensure action-oriented projects are initiated through to completion.

In the coming year, we see considerable challenge and opportunity to accomplish these goals. Input to the committee's work plan from the municipal transportation community will be greatly appreciated.

Index of MTEAC Newsletter Articles

MTEAC and the MTEAC newsletter have been with us now for four years, with this issue being the 14th published. Since the first publication of the newsletter, the varying subjects have prompted numerous requests for more information. These requests, combined with the large number of new subscribers and the continuous interest in energy and transportation, have lead us to include in this issue a list of the topics of all past feature and general articles. If you are interested in any of these articles please feel free to contact Mr. Bill Mocsan c/o TEMP, 1201 Wilson Ave., Central Building, Rm. 324, Downsview, Ontario, M3M 1J8. Please specify the issue and volume number you wish to receive.

Feature Articles

Articles

Municipal Action

Gear Up Now

Get ready! The "Challenge" strikes again – with Trucksave's 1985 Fuel Economy Challenge gearing up to be bigger and better than ever before!

The schedule for the Challenge allows trucks to leave from either truck stop on the designated route, with times and dates varying as follows:

Truck Stop	7 a.m.-noon	7 p.m.-midnight
South River-Bradford	Sept. 3-5	Sept. 9-11
Chatham-Milton	Sept. 16-19	Sept. 23-26
Bowmanville-Joyceville	Sept. 30, Oct. 1-3	Oct. 7-10

Determination of winners occurs by measuring the amount of fuel used to run a vehicle between two designated truck stops, taking into account the vehicle's exact weight and the distance travelled (L/t-100 km).

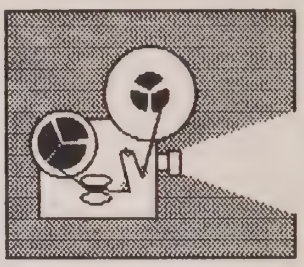
The Economy Challenge brings together some of the best trucks and drivers in an event which promises to provide exciting competition. This year's number of participants should top 300, generating stiffer competition than ever before. Don't miss this chance! Be the driving force in the Challenge!

For more details on how to enter or sponsor the event, contact Fuel Economy Co-ordinator Terry Short at 248-7191.

MTEAC EXECUTIVE COMMITTEE

Left to right: Dr. Vello Soots, Mr. Jack McCorkell, Mr. Gerry Thompson, Mr. Frank Cherutti, Dr. Louis Shallal – Absent: Mr. Doug Thwaites.

Any municipality interested in receiving a copy of the municipal driver training film *(Planning Smarter, Driving Smoother)*, please contact the TEMP office. This film package comes with an instructor's manual and a quiz pamphlet.



Cleveland's Highway Law

Highways in the worst need of repair naturally have low traffic counts, which results in low priority for repair work.
(JMcC.)

MTEAC MEMBERSHIP

Mr. D.H.C. (Doug) Thwaites,
Director of Transportation Planning
Regional Municipality of Peel

Mr. G.A. (Gerry) Thompson
Director of Roads & Traffic
Regional Municipality of Waterloo

Mr. J. (James) Mansbridge
Commissioner of Community Services
City of Sudbury

Mr. J.R. (Jack) McCorkell
Director of Operations
Works Department
Regional Municipality of Durham

Mr. D.J. (Don) McDonald
County Engineer
United Counties of Stormont, Dundas & Glengarry

Mr. D.C. (Don) Redmond
City Engineer, City of Sault Ste. Marie
Sault Ste. Marie

Dr. L. (Louis) Shallal, Chairman
Chief Systems Planning Engineer
Regional Municipality of Ottawa-Carleton

Mr. J. (John) Toffelmire
Director Traffic Engineering
City of Windsor

Mr. A.R. (Dick) Gordon
Director, Transportation Division
Municipality of Metropolitan Toronto

Mr. W. (Bill) Lambert
Policy Analyst
Toronto Transit Commission

Mr. J. (Jack) Patriarche
Co-ordinator, Transportation Program
Ministry of Energy

Ministry of Transportation and Communications

Dr. V. (Vello) Soots, Vice Chairman
Manager, Transportation Energy Office

Mr. D. (Dale) Juneja
Transportation Officer, Transit Office

Mr. J. (John) Childs
Manager, Municipal Roads Office

Mr. B. (Bill) Mocsan
Project Manager, Municipal Program
TEMP

Mr. F. (Frank) Cherutti
Executive Secretary
TEMP

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3rd Floor, Central Building
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Ontario
Ministry of Transportation and Communications
Hon. Ed Fulton
Minister

Ministry of Energy
Hon. Vince Kerrio
Minister

ISSN 0226-9384

TRANSPORTATION ENERGY NEWSLETTER

MTEAC

Energy Ontario

SEPT. 1985 MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES, AND THE PROVINCE OF ONTARIO VOL. 4 NO. 3

Computerized Fleet Management

MFMIS Development and Demonstration in Sudbury

The rising cost of fuel and maintenance in fleet operations has prompted fleet managers to look at a range of fuel-saving techniques and fuel substitution measures to reduce municipal fleet operating costs.

A computer-based, municipal fleet management information system (MFMIS) has been designed and developed specifically for fleet managers in order to simplify the acquisition, storage and retrieval of information on fleet operations. The MFMIS software package will be available free of charge to all Ontario municipalities in the near future.

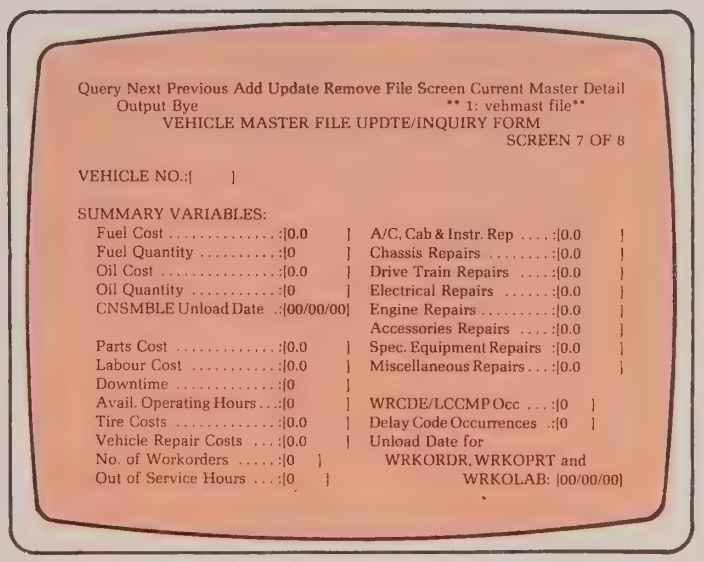
The potential benefits of the MFMIS are:

- energy savings;
- maintenance savings;
- vehicle utilization improvements; and
- increased equipment life.

These benefits are achieved by facilitating the cost-effective analysis of information to assist in the following functions:

- monitoring the efficiency of the fleet and workshop against performance standards;
- anticipating the replacement of vehicles;
- monitoring consistent component failures; and
- effectively scheduling preventive maintenance activities in the workshop.

The system was developed for municipal fleets following a series of initiatives by the Ministry of Transportation and Communications and the City of Sudbury.



Query Next Previous Add Update Remove File Screen Current Master Detail
Output Bye ** 1: vehmast file**
VEHICLE MASTER FILE UPDTE/INQUIRY FORM
SCREEN 7 OF 8

VEHICLE NO.:[ ]

SUMMARY VARIABLES:

Fuel Cost	:[0.0]	A/C, Cab & Instr. Rep	:[0.0]
Fuel Quantity	:[0]	Chassis Repairs	:[0.0]
Oil Cost	:[0.0]	Drive Train Repairs	:[0.0]
Oil Quantity	:[0]	Electrical Repairs	:[0.0]
CNSMBLE Unload Date	:[00/00/00]	Engine Repairs	:[0.0]
		Accessories Repairs	:[0.0]
Parts Cost	:[0.0]	Spec. Equipment Repairs	:[0.0]
Labour Cost	:[0.0]	Miscellaneous Repairs	:[0.0]
Downtime	:[0]		
Avail. Operating Hours	:[0]	WRCDE/LCCMP Occ	:[0]
Tire Costs	:[0.0]	Delay Code Occurrences	:[0]
Vehicle Repair Costs	:[0.0]	Unload Date for	
No. of Workorders	:[0]	WRKORDR, WRKOPRT and	
Out of Service Hours	:[0]	WRKOLAB:	[00/00/00]

An example of one of the menu-driven computer screens.

Sudbury Project

Following a comprehensive review of operations and procedures in its four fleets (public works, public transit, parks and recreation, and fire), Sudbury identified the need for a computer-based, fleet management system to improve management information and operational efficiency.

At about the same time, the Municipal Transportation Energy Advisory Committee (MTEAC), identified a need for a computerized, fleet management system which might be suitable for implementation in a number of small-to-large municipalities in Ontario. The result of these two initiatives was a project sponsored jointly by Sudbury and the province of Ontario through the Transportation Energy Management Program (TEMP), a joint program of the Ministries of Transportation and Communications and Energy.

The project was to develop a stand-alone micro-computer-based municipal fleet management information system which would meet the needs of a wide range of Ontario municipalities.

During the initial stages, the functional requirements for this system were developed and the opportunities for acquiring/modifying existing fleet management packages to suit municipal needs was assessed. The most appropriate course of action was to develop a customized system for municipal use. Through public tender, a consultant (IBI Group) received a contract to design, develop, and implement a pilot system in Sudbury.

Continued on page 2

(continued from page 1)

MFMIS

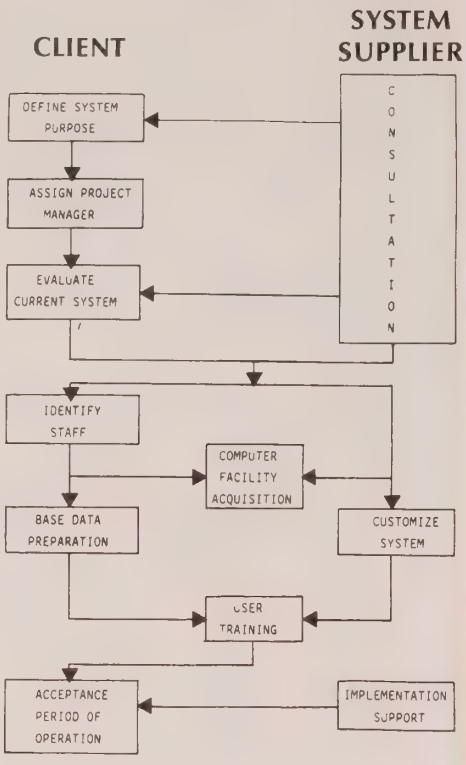
The MFMIS is a complete, stand-alone system which has been designed to run on MS-DOS and UNIX operating systems and is adaptable to a variety of computer hardware. The hardware used in Sudbury is the IBM PC/AT. The system has been developed to allow an interface with existing computer applications. In Sudbury, the system transfers data from the automated fuelling facilities and also interfaces with an existing computerized inventory system, the Municipal Maintenance Management System. MFMIS also allows all fleet information to be available through online inquiry. This system is completely menu-driven (a program which offers the user choices) making it easy to learn and operate.

Information is processed through the system in the following manner:

1. Basic information on the fleet, vehicles, workshop, inventory and employees is entered into the system at the outset of implementation.
2. Day-to-day transaction information on work orders, consumables and vehicle utilization are input daily using direct keyboard entry or a file transfer from existing automated systems.
3. Vehicle and workshop productivity are monitored against performance standards. This facility is used to flag vehicles with below-average fuel efficiencies and poor maintenance records.
4. Preventive maintenance schedules are generated to facilitate the planning of workshop activities.
5. A range of more detailed reports can be prepared such as:
   - vehicle cost;
   - vehicle utilization;
   - repair audit trail by component;
   - vehicles due for replacement;
   - vehicles' out-of-service time; and
   - vehicle fuel consumption over time.

Extensive system documentation has been developed for use in the Sudbury system including a user manual, production manual and systems manual. A week-long period of user training on-site in Sudbury was held to familiarize users with all facets of the system.

IMPLEMENTATION PROCESS



The Sudbury MFMIS system has now been implemented in the Public Works fleet and on-line operation began May 1st. During the three-month user acceptance period, minor modifications were made and the sign-off from the City of Sudbury was received in July 1985.

Further Implications

The system has now been developed so that it can be easily customized to meet specific fleet requirements. Currently, there are demonstration installations planned in three Ontario fleets. These municipalities represent the range of fleet sizes which exist in the province and will provide a basis of knowledge for subsequent implementation in Ontario.

MTEAC is fostering the formation of a user's group to provide a forum for the discussion of fleet management issues and the ongoing coordination of modifications and enhancements to the MFMIS package. A series of regional workshops on the system is planned for early in 1986.

Vehicle Master File Data

Below is a partial list of the fleet information that can be monitored on the MFMIS. The complete list includes a total of 85 information subcategories and is available in the TEMP office, (MTC, 1201 Wilson Ave., Central Building, Rm. 324, Downsview, Ont. M3M 1J8). The number of subcategories on the complete list is shown in brackets following the titles below.

Base Data (20)
Vehicle duty class
Vehicle number
Fuel type and tank capacity
Odometer reading/time
Ownership
Purchase price
Inservice rate

Specifications (16)
Vehicle make and model
Year of manufacture
Engine make/model
Tire size
Axle rating
Transmission make/model
Vehicle weight

Maintenance Schedule (12)
Last major maintenance by date and km
Last minor maintenance by date and km
Next scheduled major maintenance by date and km
Next scheduled minor maintenance by date and km

Costs (5)
License
Insurance
Overheads
Salary/wages associated with vehicle
Applicable interest rate

Expenditure Limits (3)
Maintenance
Capitalization
Insurance claims

Hourly Rental Rates (4)
MTC and municipal hourly rental rates
Minimum average $/km

Replacement Standards (3)
Fuel consumption
Distance travelled
Utilization period

Exception Standards (21)
Fuel and oil consumption
Number of repair visits by major part
Tire replacement
Scheduled minor and major maintenance
Vehicle repair costs

ELGIN COUNTY:
ONTARIO'S FIRST NATURAL GAS SCHOOL BUS FLEET

Although using natural gas for transportation is relatively new to Canadians, natural gas-powered fleets are definitely making inroads in Canada. Over 300 000 vehicles in Italy are powered by natural gas, and New Zealand hopes to see 200 000 vehicle conversions by 1990. A major step toward the advancement of the use of natural gas in Ontario occurred in June 1983, when the Elgin County Board of Education began operating the first natural gas-powered school bus fleet in the province.

The Elgin Board first started to consider converting its school buses after a visit to Harbor Creek, Pennsylvania, where the Erie School Board has had great success with its natural gas vehicles.

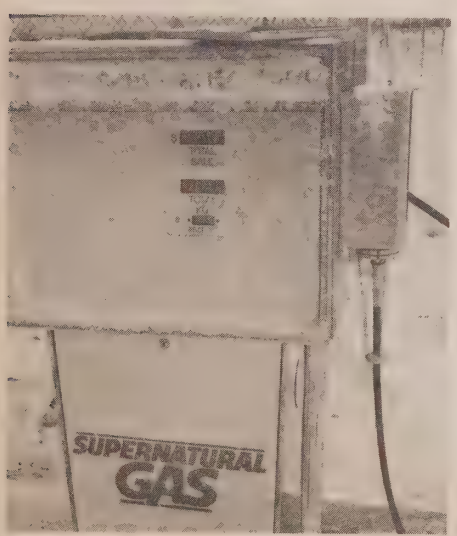
The slow-fill system allows several vehicles to be filled directly from a compressor over an interval of several hours.

The Conversion

Working with Union Gas and EMGAS, Elgin County converted 35 of its 51 school buses to natural gas. All but two of these buses are equipped with a dual-fuel system which enables bus drivers to switch from natural gas to gasoline simply by flicking a switch on the dashboard. This dual-fuel system comes in handy if drivers exceed the 100 km capacity of the three natural gas tanks installed in each bus.

Refuelling

The buses are refuelled at two sites operated by the Elgin Board.



A fast-fill natural gas pump.

These sites have a compressor and a cascade tank installation capable of both slow- and fast-fill refuelling. For fast-filling, the natural gas is drawn by the compressor from a gas main and stored in a tank of large cylinders known as a cascade. Vehicles are filled in just four minutes to a pressure of 20 MPa (3000 psi) through a regulator connected to the storage cascade.

The slow-fill system, on the other hand, allows several vehicles to be filled directly from a compressor over an interval of several hours. The slow-fill method was an important addition for the Elgin Board because it reduced both the queueing time at the dispenser and the compression costs, which occurred with only the fast-fill system.

Problems Overcome, Benefits Reaped

The only problem encountered with the school buses' conversion to natural gas was moisture freezing in the regulators of a few buses. Circulating engine coolant through the regulator has eliminated this problem and has left only benefits in Elgin County's conversion to natural gas.

Although it costs $3000 to convert each bus and the refuelling equipment is expensive, Elgin representatives feel the cost is worthwhile because they have already achieved a 50 per cent savings on fuel costs for vehicles converted from gasoline to natural gas. These savings are a result of the lower price of natural gas which ranges from one third to half the price of an equivalent litre of gasoline. In addition, further savings may result from reduced maintenance because the fuel burns relatively cleanly compared to gasoline or diesel. Natural gas also has the added benefit of providing a smoother ride and emitting fewer pollutants.

A Bright Future

The future for natural gas as an effective transportation fuel looks exceedingly bright. As Elgin County's conversion to natural gas becomes known, school boards as close as London and as far as Saskatchewan and Quebec are expressing interest. Elgin County's success story marks the increasing popularity of natural gas, which is extending beyond buses into municipal maintenance fleets, taxis, delivery vehicles and private automobiles.

Upcoming Conferences

Sept. 5-6, Vancouver, B.C.
Sixth Annual B.C. Transit Seminar, Contact: B.C. Transit, (604) 385-2551

Sept. 9-12, Montreal, Quebec
Computer-Aided Transportation, IEEE International Computer Conference and Exhibition, Contact: Compint'85, P.O. Box 557, Desjardins Postal Station, Montreal, H5B 1B7

Sept. 30-Oct. 3, Vancouver, B.C.
Annual Conference of the Roads and Transportation Association of Canada Information, Contact: Brian E. Hicks, RTAC/ARTC, 1765 St. Laurent Boulevard, Ottawa, Ont. K1G 3V4

Oct. 3-6, St. John, New Brunswick
Atlantic Provinces' Trucking Association, Annual Convention

Oct. 22-25, Hamilton, Ontario
Annual Conference of the Municipal Information Systems Association, Contact: Dennis Steen, Municipal Management Policy Branch, Ministry of Municipal Affairs & Housing, 11th Floor, 777 Bay Street, Toronto, Ont. M5G 2E5

Nov. 13-16, Jacksonville, Florida
Transportation Research Forum's Annual Meeting at the Amelia Island Plantation, Contact: Frederick C. Dunbar, c/o NERA, 123 Main Street, White Plains, N.Y. 10601, (914) 681-7254

Nov. 17-21, Montreal, Quebec
Canadian Urban Transit Association, Fall Meeting, Contact: Al Cormier, Executive Director, (416) 363-9800

Jan. 23-26, Toronto, Ontario
Conference of the Ontario Good Roads Association, Contact: B.J. McCaffery, 354 Talbot Street, Box 128, St. Thomas, Ont. N59 3T7

Update: Computerized Traffic Control Signals

When first discussed in past newsletters, the Municipal Traffic Control Signal (MTCS) projects in Brantford, Durham, and Waterloo were just getting underway. Now, four years later, the MTCS system is a proven success.

The system uses a central computer to co-ordinate all traffic signals in a municipality. The computer controls and co-ordinates traffic flow with on-line programs via a 16-bit minicomputer linked by communication lines to remote control equipment located at each controlled intersection.

The MTCS systems in Brantford, Durham, and Waterloo have been successful in several different ways. The economic savings are illustrated in the accompanying chart.

Such savings are illustrated by the Region of Durham which installed 120 traffic signals at a cost of $839,200. Durham has reaped the following benefits:

- 130 fewer collisions, resulting in a savings of $500,000;
- a $2,600,000 reduction in the need for road construction;
- a 3 300 000 L reduction in fuel consumption; and
- a savings of 8000 h of driving time per year for the entire region.

The success of the MTCS project has encouraged a number of other Ontario municipalities to follow suit. Oakville is expanding the system which it installed in 1983.

	Estimated Annual Fuel Savings ($)	Annual Operating Cost ($)	Net Annual Savings ($)	Estimated Payback Period (months)
Brantford	500,000	N/A	N/A	N/A
Region of Waterloo	2,000,000	150,000	1,850,000	5
Region of Durham	1,600,000	90,000	1,510,000	7

The use of a computerized, traffic control system has yielded many other benefits. Smoother traffic flows have reduced rear-end collisions, traffic congestion, and delays. Equipment malfunctions can be detected immediately, saving valuable time and money.

Mississauga, Brampton, and London are in the final stages of installing their systems, while St. Catharines, Burlington, and Windsor are beginning implementation. Tests have shown the MTCS concept can also be applied to small- to medium-sized municipalities.

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Ministry of Transportation and Communications
Hon. Ed Fulton
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Ministry of Energy
Hon. Vince Kerrio
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This issue was written by Denise Mustin.

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Energy Ontario

TRANSPORTATION ENERGY NEWSLETTER

MTEAC

DEC. 1985

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES AND THE PROVINCE OF ONTARIO

VOL. 4 NO. 4

Ridesharing Reduces Road Maintenance

Traffic congestion and increased road wear are interrelated problems which are increasing throughout Ontario. Since 1975, the provincial road system has expanded a meager 2.5 per cent, yet vehicle ownership has risen nearly 37 per cent. The difference in these two figures is proving to be an important contributor to road congestion which, in turn, is leading to accelerated road wear and increased commuting times.

One of the best ways to combat road wear is to reduce traffic volume by encouraging commuters to participate in carpools and vanpools. In fact, each carpool removes 1.3 cars from the road and each vanpool eliminates an average of 7.5 vehicles from the road. Last year, the province-wide Share-A-Ride program succeeded in removing 5800 vehicles from heavily-travelled roads each day, and carpool parking lots helped reduce total vehicle distance travelled by 27 million kilometres.

Based on these figures, a ridesharing program is an attractive way to help Ontario municipalities save considerable dollars in road maintenance and construction. It also assists in reducing congestion and, most important, energy consumption.

Chrysler employees participate in vanpooling.

Area-Wide Ridesharing

Share-A-Ride, a joint effort of the Ministry of Transportation and Communications and the Ministry of Energy, is presently reviewing the feasibility of area-wide ridesharing matching services in Ontario. These services, which are currently operating in the U.S., provide greatly increased opportunities for people from companies of all sizes and varying commuting situations to find potential pooling partners.

The Concept

Area-wide ridesharing services, through the use of a central office, are able to service an entire urban area. Each participant is provided with a matchlist of people living nearby who have similar work locations and hours. The list consists of names, addresses, home and office telephone numbers, travel characteristics of each participant, and information concerning transit, vanpool operators and location of useful carpool parking lots. It is then left up to the individual to form a ridesharing arrangement.

Implementation Stages

The implementation of such a ridesharing centre begins with the promotion of car and van pooling aimed at commuters who work in centres with high employment concentrations. With the data base established and the original applicants suitably matched, contact is maintained between centre and individual.

System Growth

Gradually, as the data base grows to include workers from several different companies within an area, the service becomes of use to more and more commuters as the possibility of a "good match" dramatically increases. As community awareness develops along with the data base, the ridesharing centre expands, catering to individual commuters who contact the centre directly.

The Results

The benefits of such a program are numerous. It provides savings to the individual commuter and reduces air and noise pollution and traffic congestion.

Perhaps the greatest potential benefit of an area-wide ride-sharing matching service is that it could

Continued on page 2

become the cornerstone of an energy contingency plan. During times of reduced energy supply, it would be relatively simple and inexpensive for the computer to cope with a sudden increase in the demand for matching services.

Share-A-Ride's Modernization

The Share-A-Ride program and MTC have taken the first step toward area-wide ridesharing with the implementation of a new microcomputer, the IBM PC. The original matching program was designed for a mainframe computer which could match applicants by home location only. The new microcomputer program, with its capacity for matching both home and work locations, is paving the way for area-wide ridesharing.

Drawing on the experience of similar programs from across North America, the resulting software is efficient, economical and user-friendly. It has the following capabilities:

- incorporates work times into the matching process;
- uses postal codes to identify an applicant's home and work locations;
- processes individual as well as large volume requests;
- has all applicants in a single data base;
- provides on-line processing, i.e. applicants who telephone can be matched while they wait;
- provides a covering letter, a carpool matchlist, vanpool operator information, transit information and carpool parking lot locations;
- provides statistical summaries and reports;
- offers unilingual output in either English or French; and
- ensures low-cost printing of individual matchlists (plus high accuracy) and easy access to the master files for periodic updating.

Advantages of Micro

The advantages of using a microcomputer-based carpool matching system compared to one on a mainframe are threefold:

- It offers a dedicated system.
- It is immediately and easily portable from one location to another.
- Costs are considerably lower.

The advantage of Share-A-Ride's new software is its flexibility – it can be used anywhere in Canada, thanks to its ability to translate postal codes into geo-codes relevant to a universal grid system. The software program is available at a very low cost to potential users within Ontario.

The Future of Area-Wide Ridesharing

The new microcomputer matching program is an essential element to an area-wide ridesharing service. Such a service will help reduce both the cost of road maintenance and construction and the problems of traffic congestion. It will also help increase the percentage of people in Ontario who use ridesharing – currently more than 20 per cent. Once completed, this service will be available to areas with a large concentration of employment and a large commuter shed at a relatively low cost.

Anyone interested in finding out more about the new area-wide ridesharing matching software package should contact Doug Smith, Share-A-Ride Office, Ministry of Transportation and Communications, Room 324, Central Building, 1201 Wilson Avenue, Downsview, M3M 1J8, (416) 248-7296.

Winter Driving Burns More Fuel

Fuel consumption rates are greater in winter than in summer for three major reasons. First, winter's colder temperatures reduce the operating efficiency of the vehicle by 10 to 20 per cent. This reduction is caused by an extended warm-up time and the cold lubricating system, including engine oil and drive-train lubricants.

Secondly, both snow and particularly ice cause excess fuel consumption by inducing slippage of the traction wheels, which in turn produces engine revolutions without corresponding vehicle movement.

Thirdly, ice and snow create an irregular running surface for vehicles which causes extra fuel consumption because they must continually climb over these irregularities to move forward. Freshly fallen snow of 2.5 cm or more in depth also increases fuel consumption because of the effort needed to pack down the snow under the wheels as vehicles move along and climb over and across ruts left by other vehicles.

A controlled test carried out in the Ottawa-Carleton area verifies that unit fuel consumption rates are greater in winter than in summer. An increase of 25 per cent was recorded for each 2.5 cm of snow accumulation on a hard-packed snow surface and even greater on icy road surfaces.

The Ottawa-Carleton study also compared the results of fuel consumed and the costs of plowing each survey route. The results of this comparison suggest that snow removal costs combined with bare pavement driving costs were less than driving costs on snow-covered roads.

The Metropolitan Toronto Area Transportation Energy Study (MTATES) indicates that winter maintenance accounts for 60 per cent of road maintenance fuel consumption. The following table roughly compares the fuel costs associated with the three main snow control services.

Energy Costs For Snow-Related Services

Service	4-Lane $/lane-km	Rural/ 2-Lane $/lane-km	Urban/ 2-Lane $/lane-km
Plowing	101.0	176.5	50.5
Sanding	48.3	110.5	
Salting	13.3	19.5	137.5

The results of the Ottawa-Carleton study and MTATES demonstrate that winter driving does in fact cost municipalities and the public a great deal of money. These costs, however, can be minimized with an effective snow removal program.

Intermodal Terminals

Benefiting Municipalities, Carriers and Passengers

Ontario municipalities are currently showing major interest in intermodal terminals due not only to the potential energy benefits, but also in support of urban development and tourism objectives. Such terminals are defined as transportation centres where several modes of transport are physically and operationally integrated under one roof.

Most energy conservation measures have been implemented in the urban transportation area; however, intercity passenger transportation consumes 27 per cent of all transportation energy used in Ontario. Automobile travel constitutes 74 per cent of this latter amount, while air travel accounts for 24 per cent. Rail and intercity bus, potentially the most energy-efficient modes, consume the remaining two per cent. Hence, any improvement in rail and bus services leading to a diversion of passengers to these modes can only be welcomed as it will reduce Ontario's energy consumption. Although private carriers usually have the responsibility for the provision of intercity passenger services, municipalities can play a role in improving facilities by establishing intermodal terminals.

Intermodal terminals date back to the middle ages when city gates acted as transfer points for passengers and goods. In the 1800's, the railway station took over the function of the city gate.

Currently, railway stations, intercity bus terminals and transit terminals in Ontario's municipalities are usually placed in scattered locations incurring excessive walking distances for the passenger transferring to a second mode. This is not the case in Europe where intermodal terminals are the rule rather than the exception. However, the situation in Ontario is beginning to change.

Kapuskasing Leads the Way

The first attempt at establishing an intermodal terminal was in Kapuskasing in 1977. The town recognized the need to co-ordinate the various transportation services which were located in different parts of town; these services were underutilized and inadequate. With the enthusiastic support of the carriers and local businesses, the town renovated the existing railway station to accommodate not only intercity buses, but also an airport bus service, a travel agency and a car rental agency.

The Gravenhurst train station, soon to be converted into an intermodal terminal

Project costs were $30,000. Ongoing operating costs are covered by rental income and participating carriers pay less than before due to joint use of facilities.

After the Kapuskasing project there was minimal interest in the concept by Ontario municipalities until 1983 when the Town of Gravenhurst, like Kapuskasing, identified an opportunity to coordinate its transportation services, and in this case restore a historic building, by renovating the existing railway station. VIA Rail and intercity bus carriers will be using the new terminal, and it is anticipated that rental income from commercial tenants and the carriers will cover operating costs. This project is now under construction at a cost of $170,000.

Recently, other municipalities planning new transit terminals have recognized the various benefits of intermodal terminals. Owen Sound, Brantford and Kitchener are conducting studies for transit terminals and are considering the provision of facilities for intercity bus services. It is anticipated that such terminals will fulfill not only their transportation objectives but will support downtown redevelopment and local tourism. In the case of Kitchener, a multi-storey structure is envisaged and alternative commercial development options are being examined.

With careful planning, intermodal terminals can provide significant municipal benefits in addition to those which are transport-related. For information about this topic please contact:

Mr. Sandy Casey
Transit Office

or

Mr. Geoffrey Allen
Intercity Transportation Policy Office
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1201 Wilson Avenue
Downsview, Ontario
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Rural Study

Communities with less than 25000 people represent approximately 93 per cent of the municipalities in Ontario and 29 per cent of the total population. Small and rural municipalities consume 45 per cent more fuel for transportation per dwelling unit than their more densely populated urban counterparts.

For this reason, the Ministry of Transportation and Communications, in a joint program with the Ministry of Energy, is examining energy conservation opportunities in transportation-related services and operations in small, and/or, rural municipalities. This project is in response to a recognized need to update the information municipal officials require in the field of transportation energy conservation.

Traditionally, the emphasis has been on developing energy conservation programs for large, urban municipalities, but careful consideration is now being given to smaller and rural municipalities and their unique energy-related problems. The study wishes to achieve the following goals:

- to develop recommendations for energy conservation projects which are specifically geared towards small municipalities and their energy-related problems;
- to provide information for politicians, planners, engineers and other municipal officials on how to initiate, prepare and implement transportation energy plans; and
- to provide instructions for municipalities illustrating how to select the most effective energy measures.

Implementation of the energy-efficiency measures could lead to a 20 to 35 per cent improvement in energy efficiency depending on the number and type of measures pursued. The final report is expected by early 1986 and will be discussed in more detail in a future MTEAC issue.

MTATES Update

Since the completion of the Metropolitan Toronto Area Transportation Energy Study (Phase II), Metro's planning, roads and traffic staff have been implementing specific measures outlined in the study. To date, three measures have received Metropolitan council approval in 1983 and have been implemented in the Metro Toronto area. These measures, along with the resultant energy savings, are illustrated by the following chart.

The savings resulting from the recommendations of the MTATES study are an ongoing annual occurrence. While the measures implemented in 1983 have proven to be successful, there are still energy saving measures to be implemented in 1984-87. It is estimated that the following measures will result in a total area-wide additional savings of 2.07 to 2.69, or 58 to 75 million litres per year:

- removal of unnecessary devices, such as unwarranted all-way stops;
- reducing speed limits;
- offering ridesharing incentives;
- turn conflict treatment;
- restricting on-street parking; and
- varying work hours.

These figures testify that, although the MTATES study has been completed, its benefits are just beginning.

Energy Savings

Measure	Original Estimates		Monitoring Results	
	Reduction	L/yr.	Reduction	L/yr.
1. Computer optimized timing of traffic lights	1.50%	42 000 000	1.50%	42 000 000
2a. Conversion to semi-actuated control of traffic lights	0.64%	18 000 000	1.06%	29 700 000
2b. Enhancements to semi-actuated control of traffic lights	1.34%	37 500 000	1.62%	45 300 000
3. Conversion of fixed advanced green to demand responsive advanced green	0.17%	4 700 000	0.7%	2 000 000
Totals	3.65%	102 000 000	4.88%	119 000 000

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MTEAC

Energy Ontario

April 1986

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
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Vol. 5 No. 1

Road Repair

The figures in this article are based on the results of a 1982 study for the Canadian Construction Association titled "An Evaluation of the Extent of Substandard Roads in Ontario." This article presents the findings of the study for informational purposes only.

The road systems are used for 94 per cent of all travel in Canada. Therefore, they should be protected through a proper maintenance program which will result in considerable savings in fuel consumption, tire wear and vehicle repairs, as well as other economic benefits.

Without proper maintenance the life expectancy of a newly constructed road is exceedingly short – 5 to 10 years for certain paved surfaces and 15 to 25 years for complete urban-type reconstruction.

Road system managers agree that unless road deterioration is arrested when first observed, the cost of repair for each successive year compounds at an increasing rate. For example, hairline pavement cracks can often be sealed and repaired for a relatively modest cost. If unrepaired, moisture seepage and frost can quickly contaminate and weaken the entire roadbed foundation, resulting in broken pavement, accompanied by costly and extensive repair.

Immediate road repair can also save motorists money. A deteriorated road surface increases fuel consumption because of tire slippage and/or speed changes required to circumvent potholes and other surface deficiencies.

The TRIP/Canada Study

TRIP/Canada, a public information committee of the Canadian Construction Association, conducted a study on the need for expanded road preservation and reconstruction programs in Ontario. This study focused on the King's Highways and Secondary Highways, which carry approximately 50 per cent of the traffic in Ontario.

Poorly maintained roads can cost drivers up to 56 per cent more fuel and money than roads that are kept in good condition.

Road Deficiency in Ontario

It was found that the pavement condition of 8.5 per cent of the 21 219 km of King's and Secondary Highways is deficient, based on standardized pavement condition ratings. In addition to these 1822 km, another 7061 km of roadway are expected to deteriorate from good to fair or poor condition within the next five years and will need extensive surface repair.

Road Improvement Costs

It would cost a total of $868 million to bring Ontario's deteriorated King's and Secondary Highways into good condition. If the repair work is not done in the next five years, the roads will deteriorate further and need rebuilding at a cost of $1.84 billion.

Wasted Vehicle Operating Costs

Immediate road repair reduces vehicle operating costs. The Canadian Construction Association study found that the average Ontario driver wastes $97 per year in operating costs – fuel consumption, tire wear and vehicle repairs due to the deteriorated condition of the province's main roads. Road tests have established that vehicles travelling at a uniform 60 km/h base speed consume 34 per cent more fuel on fair or poor road surfaces and up to 56 per cent more fuel on very poor road surfaces than vehicles travelling on good surfaces. The increased fuel consumption results from excess resistance and an inefficient transfer of engine power to vehicle propulsion.

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Road repair saves motorists money. In Ontario, it costs 11.3 ¢/km to drive on a road surface in fair condition and 13.2 ¢/km to drive on a road in very poor condition. However, it costs only 8.4 ¢/km to drive on a road surface ranging from good to very good condition.

In 1983, motorists in Ontario drove some 35 per cent of their vehicle-kilometres over the province's deficient roads. The cost of driving on these substandard roads is $369 per driver. Had these roads been up to standard, this travel would have cost only $272 – a savings of $97 (26.3 per cent). These figures are conservative, as the calculations are based on data from studies of passenger cars driving over straight and level roadways at a constant speed of 60 km/h. Also, the cost added as a result of slowing and reaccelerating to negotiate bad stretches of roadway, traffic congestion caused by narrow lanes, lack of left-turn space, and overcrowded access roads was not considered.

Economic Benefits

In addition to vehicle operating cost savings, a $173.6 million-per-year road modernization program would support an estimated 5130 new jobs in the construction industry and the related fields of equipment manufacture and supply, materials, production and transportation. These new jobs would generate an estimated $96.6 million in wages, producing $21.3 million in federal and $10.2 million in provincial income taxes.

Energy Conservation

The Canadian Construction Association study clearly demonstrates the cost benefits of a road maintenance program. Several measures to reduce construction costs can make the program more efficient:

- reduce the use of asphalt cement, through asphalt pavement recycling, substitution of alternative materials, and improved production methods;
- reduce lane and shoulder widths on minor roads, while ensuring that traffic safety and capacity are not affected; and
- improve fuel efficiency in fleet and equipment operations by practising measures such as driver training courses, vehicle maintenance and improved vehicle productivity.

A maintenance program that consists of these measures will be able to realize considerable energy dollar savings while at the same time successfully fighting road deterioration.

Correction Factors for Road Surface

Uniform Speed of Vehicles MPH (km/h)	Correction Factors by Road Surface: High-Type Concrete or Asphalt	Badly Broken and Patched Asphalt	Dry Well-Packed Gravel	Loose Sand
10 (16)	1.00	1.01	1.09	1.23
20 (32)	1.00	1.05	1.13	1.28
30 (48)	1.00	1.20	1.26	1.40
40 (64)	1.00	1.34	1.56	1.73
50 (80)	1.00	1.50	1.70	2.00

Traffic Signal System in the Town of Dundas Saves $85,000 Per Year

In 1982, the Regional Municipality of Hamilton-Wentworth worked with TEMP on a major transportation energy management study.

As part of the ongoing implementation of energy-saving measures in the Regional Municipality of Hamilton-Wentworth, traffic signal interconnection and timing improvements have been implemented in the Town of Dundas, one of six municipalities that form the Hamilton-Wentworth Region.

Eleven traffic signals are located at the intersections on regional roads within the Town of Dundas. Prior to 1984, eight of the 11 signals were linked by a traffic signal interconnection which had been in operation in the town for more than 20 years. The traffic control system had the capability of supplying only two patterns for traffic flow. In 1984, the TRANSYT (version 7-F) traffic signal optimization program developed by the Transportation Road Research Laboratory in England was used to evaluate signal timing alternatives for improving the performance and energy efficiency of traffic flow within the town.

As a result of the review, a third timing pattern, as well as nighttime flashing of selected signals, was added. An additional signal was also added to the interconnected system. The improvements are predicted to provide motorist fuel savings of $85,000 per year.

Coincident with the signal timing improvements, major cable maintenance was performed to implement the third timing dial. The total cost of implementing the signal timing improvements, including major cable repairs, was under $10,000.

Transportation Fuel Consumption in Ontario

In the transportation sector, large savings in fuel consumption can be realized through the efforts of municipalities and the public. The magnitude of savings depends on the measures taken, but past experience shows that even small efforts can help to significantly reduce the enormous fuel bill which Ontario drivers have been paying.

Although previous efforts to conserve fuel have been successful, there is still a great deal which could be done, both to save fuel itself and to simply save money. Because prices of transportation fuel are predicted to rise dramatically again in the next decade, it is important to consider carefully the means at our disposal to cut transportation fuel consumption.

The accompanying table shows the approximate cost of transportation fuel per year in Ontario. The figures show the enormous quantities of fuel consumed strictly by private vehicles. If we added the fuel used for commercial vehicles into the calculations the figures would rise by as much as 40 per cent.

Fuel Expenditures in Ontario (Passenger Vehicles)

	(Millions $/year)
Thunder Bay	114.20
Waterloo	248.47
Wentworth	338.44
York/Metro Toronto	1735.73
Carleton	484.81
Durham	64.97
Middlesex	273.46
Niagara	1.43
Peel	448.39
Sudbury	174.93
All Ontario	**7140.05**

Conservation Efforts

Since the oil crisis in the 1970's, much has been done to reduce the cost of driving and operating vehicles. Behavior modifications have resulted from rising fuel costs and government promotion of conservation. The public has changed its transportation habits and behaviour in the following ways:

Increased Transit Use
More and more people have begun to view transit as a cost-efficient and convenient mode of transportation within the city. The number of transit users has increased with improvements in service and is expected to continue rising. In Toronto, the percentage of people using transit has risen gradually to approximately 25 per cent while, in Ottawa, the percentage of people using transit has risen to almost 60 per cent.

Carpooling
In cases where the transit system may not be practical for travel, groups are carpooling to and from the work place. Ridesharing lowers the individual costs of travelling as well as the overall fuel consumption.

Smaller Vehicles
Another behavior change which has produced considerable savings has been the trend towards smaller, more fuel-efficient vehicles. If a vehicle is not being used to its full capacity it only makes sense to switch to a more economical size. Car manufacturing companies have also begun to make smaller cars more appealing to consumers, thereby strengthening the overall trend.

Municipal Efforts

Municipalities have also implemented measures to save fuel and money.

Alternative Fuels
Many municipalities have started to use propane and natural gas in an effort to reduce fleet fuel expenditures. Finding the savings to be substantial (30-40 per cent), many municipalities have proceeded to convert their entire fleet to propane or natural gas.

Traffic Management
Municipalities have also developed innovative traffic management methods, ranging from eliminating unnecessary stop signs to computerized traffic signal co-ordination. Improved traffic flow cuts fuel costs because of fewer required deceleration and acceleration cycles and delays associated with stop-and-go driving.

Fleet Management
Fleet management techniques have taken on new dimensions, such as the Municipal Fleet Management Information System (MFMIS), which monitors and manages nearly every aspect of regular fleet operation using an IBM computer.

There are many ways of cutting fuel consumption; only a few are mentioned here. So far, conservation measures have helped reduce fuel consumption and brought to the public's attention the need to learn how to conserve now before we face another crisis.

New conservation methods are constantly being studied because it is inevitable that the overall trend of oil prices will keep rising. Fuel prices, while stable or declining right now, are expected to rise again in the early 1990's. For this reason and because oil is not a completely unlimited resource, it is important to keep working to reduce oil demand. By using our resources more efficiently, we can help Ontario's economy grow and compete in world markets.

Natural Gas Powered Bus Exceeds All Expectations

After excellent results in recent testing, six buses will be running on natural gas in Hamilton by spring 1986, reports Roy Duncan, Director of Engineering for the Hamilton Street Railway (HSR).

In extensive road tests conducted in November, 1985 by HSR, the first dedicated natural gas bus in North America exceeded all expectations for power and fuel efficiency. On November 15, the HSR Board of Directors approved the additional fuel conversions.

With funding and technical assistance from the Ontario provincial Ministries of Energy (MENG) and Transportation and Communications (MTC), and the federal Department of Energy, Mines and Resources (EMR), and with the help of Union Gas, HSR converted a 1977 12 m (40 ft) GM coach to natural gas. The coach uses a 170 hp Swiss-made Iveco natural gas engine (4 cycle, in-line-6 cylinder, spark ignited).

"The tests went far better than even we thought they would," reports Bruce Rogers, Manager, Natural Gas Vehicles (NGV) Sales for Union Gas. "These results mean viable commercialization of transit buses in North America. NGV fuel economy is better than diesel and the power ratings are excellent."

Three buses ran the test circuits: a standard diesel bus from the HSR fleet, the natural gas bus, and a second diesel bus with the four-cycle diesel version of the natural gas engine. For the first test, they were loaded to average seating capacity (about three-quarters) and run twice around a 32 km route that took the buses up and back down Hamilton Mountain. Drivers were alternated to control results for any differences in driver performance. Duncan reports that switching drivers had no impact, and performance targets were exceeded on natural gas.

Hamilton Transit proves natural gas buses a commercial success.

For the second test, the buses climbed Hamilton's steepest hill and negotiated two right-angle turns with the equivalent of a full passenger load (seated and standing). HSR's targetted performance required that the natural gas bus "go over the top" at 20 km/h. The bus went over at 42 km/h – again exceeding all expectations.

Drivers Victor Bridgette and Fred Fama were both enthusiastic. "I was very impressed with it," says Bridgette, HSR's training supervisor. "I find no real difference between our standard diesel bus and the natural gas bus. It was peppy. As far as I am concerned – it's a go."

Fred Fama has 17 years experience as a transit driver and has been instructing HSR drivers since the early 1970's. "The natural gas bus was terrific," says Fama. "I was surprised at the power it had. It was fantastic on the straightaway and by downshifting on the hill it was very powerful."

The HSR natural gas bus was one of the prominent displays which attracted a lot of interest at the recent Energy 2000 Conference in Toronto, which was sponsored by the Ontario Ministry of Energy.

Source: November/December issue of Natural Gas Vehicle Bulletin
Editor: Mr. R.B. Cumming

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TRANSPORTATION ENERGY NEWSLETTER

MTEAC

JULY 1986

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A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES AND THE PROVINCE OF ONTARIO

Vol. 5 No. 2

Small Municipalities Can Save

All levels of government are interested in energy conservation because fuel savings can lower costs and generate public interest in reducing personal energy expenses. Many larger municipalities have achieved substantial savings through management programs and similar savings are possible for smaller municipalities. In each municipality, a reduction in petroleum fuel consumption would generate additional money which could be used to maintain and construct roads.

An Energy Management Program

To start an energy management program, the municipality will first need to assign an individual to establish and manage the program. In the initial phase, the manager would have to identify fleet conservation opportunities, develop an energy conservation policy and establish the monitoring procedures for the program.

Conservation Opportunities in the Fleet

The manager and municipal staff must pinpoint the conservation opportunities which exist in the present maintenance and fleet utilization systems. An active review of the cost-effectiveness of these areas would identify common problems. Some important areas for review are:

- method of recording the fleet's energy use;
- vehicle sizing, specifications and options;
- vehicle maintenance practices;
- driver training; and
- the thermal integrity of fleet garages.

Small fleets can save too

The efficiency of fleet vehicles can be increased by scaling down underutilized vehicles and increasing the size of a vehicle which is consistently being used beyond its capacity.

Proven equipment options such as radial tires, drag-reducing devices and thermostatically controlled radiator fans and shutters can substantially increase the efficiency of a vehicle. Specifying particular transmission and axle ratios and adding tag axles can also be effective conservation techniques.

In heavier vehicles, diesel engines can replace gasoline engines because diesel fuel is more efficient than unleaded gasoline. Although the higher initial cost of buying a diesel vehicle may offset some of the benefits, diesel engines tend to have longer operating lives and require less maintenance.

Propane and natural gas are currently the most viable alternative fuels for a fleet operation. Both fuels require only the installation of pressurized fuel tanks and engine conversion kits. The use of alternative fuels can result in savings of up to 40 percent on the annual fuel bill.

The energy manager may wish to contact the Transportation Energy Office of MTC (416-248-7296) for help in determining the conservation opportunities which are suitable for this program.

Monitoring

A procedure for recording energy conservation related data is essential because progress can be measured only when historical trends have been determined. The manager should develop a method of monitoring a vehicle's initial cost, fuel and oil consumption, utilization and maintenance time and costs. A review of the existing recording procedures will highlight any inadequacies and new procedures should be added to address these problems.

continued . . .

After a monitoring system is in place, the data collected will enable the manager to determine the benefits of the conservation actions. Results should be summarized and reported to interested municipal council members and staff on a regular basis.

Road Maintenance Opportunities

Any significant reduction in road maintenance service would be a risk because it could lead to safety hazards and increased fuel consumption by the driver. However, there are certain maintenance policies which should be reviewed such as:

- roadside grass cutting and litter control;
- frequency of gravel road grading;
- frequency of, and material used in, hard top surface repairs;
- frequency of application of sand and salt (reduced application of sand would also save effort during the spring clean-up); and
- depth of snow required to commence plowing.

Such a review would ensure that the existing maintenance practices are changed if they are not energy efficient.

Communicate Findings

The long-term success of the energy management program will depend on support from within the municipality. The manager should make every effort to communicate with other municipalities which are involved in energy management so that new ideas and techniques can be incorporated into the local program. The incorporation of new ideas will ensure that the program remains current and interesting to municipal representatives.

Information can be exchanged between neighbouring municipalities or through the Municipal Transportation Energy Advisory Committee (MTEAC).

Program Summary

A small or rural municipality should begin a transportation energy conservation program by selecting a manager. The manager will then define the energy policy with the help of municipal staff. Once a policy is defined, the current system should be reviewed with energy conservation in mind.

Changes, suggested in this article or in other publications available from MTEAC, should be incorporated in the present system. Finally, the manager should try to keep local interest high by initiating ideas from other municipalities and documenting the cost savings which result from the conservation program.

If you would like more information about how to start a transportation energy conservation program in your municipality, please contact MTEAC at the address listed on the back of this newsletter.

Seminars

The Transportation Energy Management Program (TEMP) recently sponsored five seminars to discuss the findings of an MTEAC study of the conservation opportunities available for smaller municipalities. The seminars promoted the use of ideas contained in a new booklet, "Energy Conservation through Municipal Management - An Overview of Opportunities for Small Municipalities."

The day-long seminars were held during February and March in London, Owen Sound, Toronto, Kingston and North Bay. Approximately 160 people attended including road superintendents, engineers and reeves.

Presentations included an outline of an energy program for small municipalities and a description of specific energy conservation opportunities available for implementation under this program. Participants were also shown the driver-training film, "Planning Smarter/Driving Smoother," and a slide show, "Maintenance for Fuel Economy." The film was followed by a presentation providing tips to the municipal representatives on how to get started in an energy conservation program.

At each seminar a representative from the Ministry of Energy discussed the current energy situation, future trends in world oil prices and why, in the face of falling oil prices, it is still desirable to conserve energy.

The information, which was discussed and distributed at the sessions, is available free of charge from the TEMP office. Anyone who was not able to attend the seminars and who would like to receive some of the material should write MTEAC at the address listed on the back page of this newsletter.

BOOKLET OUTLINES OPPORTUNITIES

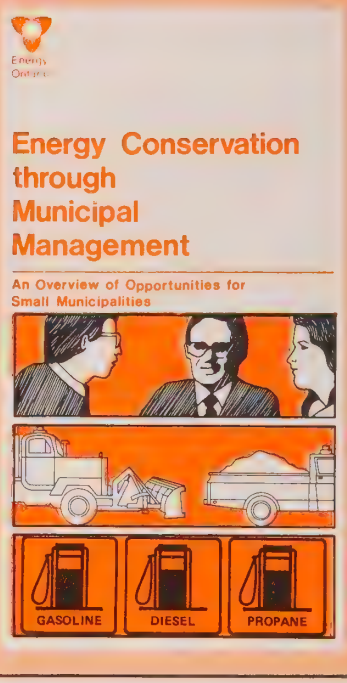
The results of the MTEAC study of small municipalities have now been published in the form of the seventh summary booklet of the Transportation Energy Analysis Manual.

The main objective of the booklet, "Energy Conservation through Municipal Management - An Overview of Opportunities for Small Municipalities," is to assist small municipalities (pop. 5000 to 15000) in developing and implementing energy conservation projects.

The 12-page booklet describes the procedure for initiating and implementing an energy conservation program and provides examples of the opportunities for conservation in smaller municipalities.

The possible savings are presented as a means of reducing the municipal budget or of providing funds for the municipality to undertake additional work in either road construction and repair or in another department.

For a free copy of the booklet write to MTEAC at the address listed on the last page of this newsletter.



Road Surface Recycling Machine

Ontario municipalities will benefit from an exciting new machine that has been developed in this province. Road Surface Recycling Inc. (RSR) is now demonstrating a new machine which rehabilitates distressed asphalt pavement and adds a new layer of asphalt in one pass. This company has worked closely with the Ministry of Transportation and Communications, Bituminous Section, and the National Research Council to perfect the machine which is now being tested.

The idea of recycling asphalt and resurfacing a road with one machine has been a topic of research since the early 1970s when oil and asphalt prices rose quickly. Several similar machines are presently in operation in Europe and the United States but none encompass all of the features of the RSR design. RSR spokesmen claim the following advantages with their machine.

Advantages of the Road Surface Recycling Machine (RSR)

- cost reduction of 20 to 60 percent compared with conventional methods
- energy conservation of 45 to 80 percent
- environmental factors: no dust; complete combustion in the heating system; 100 percent use of the existing asphalt surface
- superior results: deep heat penetration gives greater rejuvenation; bonding of new layer occurs while existing asphalt layer is hot. These features plus the addition of a virgin asphalt top will produce a road surface with a longer life expectancy.
- reduced traffic disruption: reprocesses 2 km of road per day; contributes to energy conservation in private vehicles by reducing traffic delays; decreases hazards to the public

Because of spending priorities and the increased cost of asphalt paving, many road authorities are examining ways of recycling existing asphalt in conjunction with the addition of new material to rehabilitate pavement. The RSR method may reduce the use of new asphalt by 75 percent, making it an attractive alternative to conventional paving.

Cost Comparison

	CR	RSR #1	RSR #2	RSR #3
Average Cost/km	$69 520	$55 680	$43 040	$26 080
Oil Consumption/km (L)	99 889	54 480	35 600	13 350
Aggregate/km (t)	1 100	750	450	150

Source: RSR Canada Inc. and TRIP Canada (for conventional resurfacing)

The RSR Process

The RSR machine performs the following steps:

1. The existing asphalt is heated to a depth of 40 mm using hot gases to create a scrubbing action on the asphalt surface.
2. The heated asphalt is scarified (raked) and tumbled to bring the unoxidized asphalt to the surface and to aid in the rejuvenation process.
3. The rejuvenating agent is added by a spray system to restore flexibility to the existing asphalt.
4. The rejuvenated asphalt is leveled and virgin asphalt may be added if required to achieve proper road geometry and to fill ruts.
5. Virgin material is placed on the rejuvenated material to create the driving surface.

Since 1980, D. Crupi and Sons Construction Ltd. has operated a prototype heater-scarifying machine which is not equipped to lay new asphalt. Now that the new RSR machine is being tested, many municipalities who are faced with constrained budgets and aging roads will be watching its operation with interest this summer.

The accompanying table compares conventional resurfacing (CR) with three alternatives using the RSR machine. The costs are based on virgin asphalt priced at $32/t. RSR #1 adds 40 mm of new asphalt; RSR #2 adds 25 mm and RSR #3 adds 10 mm. Up to 75 mm of virgin asphalt may be added, depending on the condition of the road.

RSR machine paving demonstration in Ottawa

Municipal Action

MFMIS: Implementation

Three Ontario municipalities have successfully implemented the Municipal Fleet Management Information System (MFMIS) as part of a system demonstration project sponsored jointly through TEMP by the Ministry of Energy and the Ministry of Transportation and Communications. The MFMIS is a microcomputer-based management system which monitors all aspects of fleet operation including maintenance, shop floor planning and fuel dispensing.

Whitby, representing small municipalities, Sault Ste. Marie, representing medium-sized municipalities, and the Regional Municipality of Hamilton-Wentworth, representing larger municipalities, are all using MFMIS to manage and control their municipal vehicles and equipment, their parts inventory and their shop floor planning.

As part of the project, each municipality was asked to review the system features and compare them to its current mode of operation. Based on the findings, each test resulted in changes to the software to suit specific needs. Whitby incorporated a tire management and inventory package; Hamilton-Wentworth added a more sophisticated profit-loss reporting system for its vehicles and a detailed parts inventory tracking system. Both Hamilton-Wentworth and Sault Ste. Marie converted the original MFMIS to run on a multi-user basis so data entry and system utilization could be operated from a number of locations. Sault Ste. Marie also plans to link its MFMIS with an automated fuel dispensing system. This will allow fuel transactions to be entered directly into MFMIS without manual labour.

At the three test sites, the fleets managed by the system include parks and recreation, public works, fire, cemeteries, library, roads and traffic. TEMP also anticipates use by public transit agencies in the near future. The MFMIS has the versatility, flexibility and capability to assist in the management of all types of municipal vehicles and equipment ranging from weed whips to 10-tonne dump trucks.

One of the objectives in conducting the testing project is to display the adaptability of the MFMIS. The test demonstrates, through the use of three different-sized municipalities, that MFMIS can be used for fleet management in any size fleet. The only restrictions are cost-effectiveness for very small fleets and computer memory capacity for very large fleets.

The test also proves the flexibility of MFMIS by applying system software changes specific to the needs of each test site. These changes were incorporated into the system fairly easily and are now available as part of the MFMIS package.

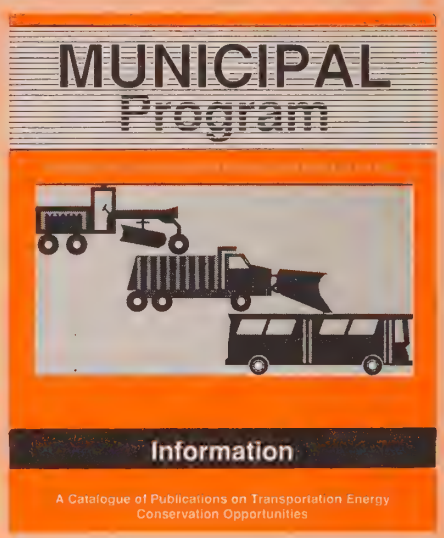
MFMIS software and support materials are available free of charge from the TEMP office to any Ontario municipality or government agency. TEMP staff will provide an introductory demonstration and are available for presentations to municipal associations and groups. For more information write or call: Mr. Leo Larkin, Whitby; Mr. Paul Perrin, Sault Ste. Marie; Mr. Bob Mulholland, Hamilton-Wentworth; or, Mr. Bob Johnston, Sudbury. At MTC contact Mr. Bill Mocsan at the address below.

Display Available

The Municipal Program recently designed a display highlighting energy conservation opportunities in all facets of municipal transportation. At the Canadian Public Works Association conference in Ottawa this May, the display proved very effective in informing the conference participants about municipal energy conservation. If you or your organization would be interested in using the display for a conference, show or special event, please contact MTEAC at the address listed below.

Catalogue of Publications

A new booklet produced by MTEAC entitled "Municipal Program" catalogues all of the TEMP publications which are geared to municipal energy conservation. The booklet provides a brief description of each document including the subject, the number of pages and the price. If you would like a free copy of "Municipal Program," please contact MTEAC at the address listed below.



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Minister

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Minister

This issue was written by Ann Marie Jackson.

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Energy Ontario

TRANSPORTATION ENERGY NEWSLETTER

MTEAC

September 1986

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES AND THE PROVINCE OF ONTARIO

Vol. 5 No. 3

Managing the Queensway

by D.H. Brousseau

Since there is a proven relationship between traffic flow and energy efficiency, we feature this article as an example of traffic management innovation.

The Province of Ontario is presently rehabilitating and modernizing Highway 417, known locally in Ottawa as the Queensway. This highway runs from the east to the west end of the urban area and provides the main commuter access to the central business district. Highway 417 is also the only east-west route for long distance travel and intercity transport.

Ottawa-Carleton has shifted its priority from the construction of new freeways to the development of public transit. The region's official plan strongly endorses the transit option, and in response, the transportation department has accelerated the construction of a rapid transit system, the Transitway. At the present time, Ottawa-Carleton is in the middle of the construction phase of the Transitway project. Service is available from the westerly end of the city to the central business district, but it has not yet reached the fast-growing eastern suburbs of Orleans.

The reconstruction of the Queensway creates obvious traffic management problems. The enormous disruption in ordinary traffic patterns occurs when the transit option has not been fully developed, and therefore, alternate means of travelling must be found for both commuter and through traffic.

The Problem

The primary focus of this year's rehabilitation program is the St. Laurent Boulevard interchange, a main exit in the east end of the City of Ottawa. During the rebuilding and modernization of this interchange, Ottawa-Carleton is co-ordinating the construction of an underpass for the Transitway route.

Ottawa bus priority lanes

To facilitate the construction activity, the Queensway is reduced from three lanes to two in either direction. This lane reduction is complicated by the Highway 417/Highway 17 interchange immediately east of St. Laurent Boulevard. At the junction of the highways, the Queensway widens from three lanes to four in the eastbound direction. And in the westbound direction, four highway lanes merge to three Queensway lanes.

To achieve the lane reduction in the westbound direction, it is necessary to reduce both highways by one lane. This reduction means that the number of lanes available for westbound traffic on Highway 17 is cut in half. The capacity is, in fact, reduced from 4000 vehicles per hour (the capacity of two uninterrupted freeway lanes) to 1600 vehicles per hour (the capacity of one restricted freeway lane). The pre-construction peak hour on this section of the Queensway had a volume of 3500 vehicles, which represents two-thirds of the through traffic in the St. Laurent area. It is obvious that under construction conditions the Queensway cannot handle the peak hour traffic demand.

The region's traffic department has calculated that even with the limited number of alternate routes running at 100 percent capacity it is still impossible to handle the existing demand. Traffic displaced by the construction will exceed the available transportation system's capacity by at least 800 vehicles each hour in the peak period. This number represents roughly one-quarter of inbound vehicles on Highway 17.

Mitigation

To manage the capacity shortfall, the Regional Municipality, in close co-operation with the Ministry of Transportation and Communications

continued . . .

and the Ottawa-Carleton Regional Transit Commission (OC Transpo), has devised an extensive strategy to mitigate the impact of the loss of Queensway lanes.

The strategy concentrates on four main elements:

1. public transit as an alternative
2. maximization of existing system capacity
3. extension of inter-agency co-ordination
4. an extensive public awareness campaign

Public Transit

The transit option is the primary focus of attempts to deal with the 800-plus vehicle shortfall. Ottawa-Carleton has one of the most successful transit systems in North America; however, with no available space for the buses to travel, the transit system's capability for moving commuters is severely limited. Therefore, a number of transit priority measures have been implemented to enhance the chances of success of this option.

The "edge" has been provided to OC Transpo by MTC's construction of a "park and ride" lot in the Orleans area. This lot offers a free parking facility for motorists willing to leave their cars in favour of the bus. MTC has also created an exclusive bus lane along the most congested part of the Queensway east of St. Laurent by improving and paving the shoulder of the highway.

The buses exit the Queensway bus lane at Highway 417 and detour around the St. Laurent area on exclusive bus lanes implemented on adjacent regional roads. This route leads to the most easterly Transitway station from which point the buses have uninterrupted access to the downtown area. With these measures in place, OC Transpo has proceeded to rent 20 extra buses and has, thus, been able, with extensive schedule modifications, to increase its service by 30 percent, offering an additional 1300 seats per hour in peak periods.

Traffic Management

To ensure that the alternate routes function at their highest capacity, the region has instituted a number of traffic management measures.

For example, signal timing has been changed to enhance traffic progression and timing plans will be continually reviewed. A number of double turning lanes have also been introduced to further extend intersection capacity. Strict parking and stopping bylaws have been passed, and all utilities have been asked to limit their road cuts on alternate routes to off-peak hours. Some minor intersection improvements are also planned along the alternate routes. In addition, a lane has been added to an existing three-lane roadway, one of the principal alternates, to accommodate an exclusive bus lane.

The area police forces have agreed to intensify their enforcement activities for all of these measures. In particular, off-duty police officers have been contracted to augment enforcement of the bus lane operations. Naturally, enforcement is the key factor in making the strategies work.

An attempt to extend the peak hours has been made by encouraging the use of flexible hours in the offices of the region's largest employer, the federal government. So far, six out of 13 major departments have replied that they would consider requests from their staff who wish to alter their start and finish times.

Inter-agency Co-ordination

To ensure the fullest possible co-operation and co-ordination of efforts, a committee comprising officials of MTC, the Regional Municipality, area municipalities, OC Transpo, the police, utilities companies, school boards, and emergency services was established at the beginning of the Queensway rehabilitation program.

Public Awareness

This committee determined that an extensive campaign was essential to alert the public of the impending traffic problems and to advise it of the options available to deal with the disruptions.

In order to generate interest and attract media attention, three "open houses" were held in the areas to be most severely affected. The meetings, which were widely advertised, attracted several hundred people and succeeded in focusing media attention on the project and the mitigation proposals.

Another well-publicized strategy was the creation of a special telephone line designed to offer advice and information about the ongoing traffic problems. The service, known as the Queensway Help Line, is operated by the region. Using MTC's daily construction status reports as a guide, the phone line provides both the public and the media with up-to-date information.

Just prior to the initial work in the St. Laurent area, MTC undertook a door-to-door information blitz advising approximately 45 000 households and businesses in the east of the upcoming work. The information package contained a flyer describing the project in general terms, with a summary of suggestions on how to deal with the anticipated disruptions. OC Transpo included a brochure on its increased transit service, and the region recommended carpooling as an alternative. OC Transpo also undertook an elaborate publicity campaign, the central theme of which was "Jump the Jam" by taking OC Transpo.

Throughout the rehabilitation program, MTC has maintained a steady stream of press releases and, during critical stages, has used newspaper ads and radio commercials to increase the amount of available information.

Co-operation

The most important measure being implemented under the mitigation strategy is the co-operation of the people of Ottawa-Carleton. The Co-ordinating Committee has asked that individuals consider the following suggestions:

- Avoid unnecessary trips.
- If possible, adjust working hours.
- Switch to public transit.
- Form carpools.
- Use alternate routes.

Because of the extensive publicity effort, the public is aware of the role it must play in co-operation with the local and provincial governments. This public involvement will be the basis of the success of the traffic management program.

Mr. Doug Brousseau is a special projects officer with the Regional Municipality of Ottawa-Carleton.

Fuel Control Saves Money

Automated fuel-dispensing systems are a reliable means for municipalities to control fuel distribution. These systems vary in their capabilities, but at a minimum, they record, through automatic data entry at the pump, the vehicle, the quantity of fuel dispensed, and the date. In addition to this basic data collection, most systems have optional features, such as issuing receipts, generating reports, and monitoring levels of fuel-holding tanks.

Automated dispensing systems have been used successfully for many years by commercial fleets. The service was purchased from the major retail gasoline firms, who maintained the dispensing equipment and provided monthly invoices for each client's fuel. Municipalities which dispense their own fuel recognized the advantages of controlled access to fuel and began installing automated fuel-dispensing systems in their fleet garages.

A municipality has much to gain from an automated fuel system, particularly in the areas of energy and cost savings. A well-structured and maintained system virtually eliminates fuel loss through improper recording, theft, or negligence. Most systems can be customized to provide monitoring information on fuel efficiency and, therefore, ensure energy-conscious vehicle maintenance and replacement schedules.

The automated systems can also be interfaced with a fleet management information system so that they automatically transfer fuelling information. This type of interaction can save a great deal of time by eliminating the need for manual recording, reducing transcription errors, and summarizing fuel transactions. In addition to encouraging energy conservation and time savings, the automated system eliminates the need for a dispensing area attendant.

A fuel-dispensing system generally consists of the following:

- a card reader on the pump island, which identifies the user and/or the vehicle and controls access to the pumps;
- a microcompressor, which runs the reader and records the transactions;
- some type of secured memory, so that transactions are not lost if the power fails or the unit is damaged;
- a host computer, which can be a wide range of available products.

Metro Parks and Property Computrol system

An employee who wishes to fuel a vehicle first identifies himself and the vehicle at the reader. Identification procedures usually entail providing one or two system cards for the reader's inspection and punching in identification numbers or odometer readings. The process is very similar to using an automated banking machine. The employee selects the type of fuel and the pump he wishes to use and then pumps the fuel into the vehicle. After the transaction is complete, the system can issue a receipt if it is equipped with a printer. The employee must repeat the identification procedure to obtain the receipt.

Competition Increasing

Gasboy of Canada Ltd., based in London, Ontario, is perhaps the most widely known fuel-dispensing system distributor in Ontario. Recently, however, Computrol Systems Ltd., a Vancouver-based firm, has made a big marketing push in the eastern Canadian market. An offshoot of an American company, Gilbarco Canada Inc., is also trying to tap the Canadian municipal market.

Mr. Zelio Quaiattini, office manager in the City of Sudbury's maintenance department, says their Gasboy system has "worked out well." Their five-year old system cost $15,000 at the time of installation. Sudbury chose the automated system primarily to eliminate paperwork. The Gasboy transfers information into the city's inventory system, through a modem, two or three times each week.

Gasboy of Canada Ltd. claims its systems are trouble free and cost-effective. The most popular model, the A4C, has a base price of $9,750. This system can use hole-punched or magnetic-strip access cards and will operate a four-pump network. Gasboy designs its systems for self-diagnostic maintenance, and therefore, they are divided into easily replaced components. Mr. Bruce Urquhart at (519) 453-5340 would be glad to provide more information on the Gasboy system.

Information from a Gasboy system can be used to compile reports for use in management. Gasboy's parent firm, William M. Wilson's Sons Inc., will produce these reports for a fee, or the fuel system can be connected to a fleet management system such as TEMP's Municipal Fleet Management Information System.

Computrol's leading edge is their access card, a unique planar induction coil configuration contained in a credit-card-sized casing. This card is only held against a reader plate — there is no need to insert it into the machine. Because there are no openings in the unit, the risk of damage from cards jamming, tampering, or adverse weather conditions is greatly decreased.

Computrol recognizes the card as the system's main advantage, and so does the user. For example, Mr. Paul Yarwood at Metro Toronto Parks and

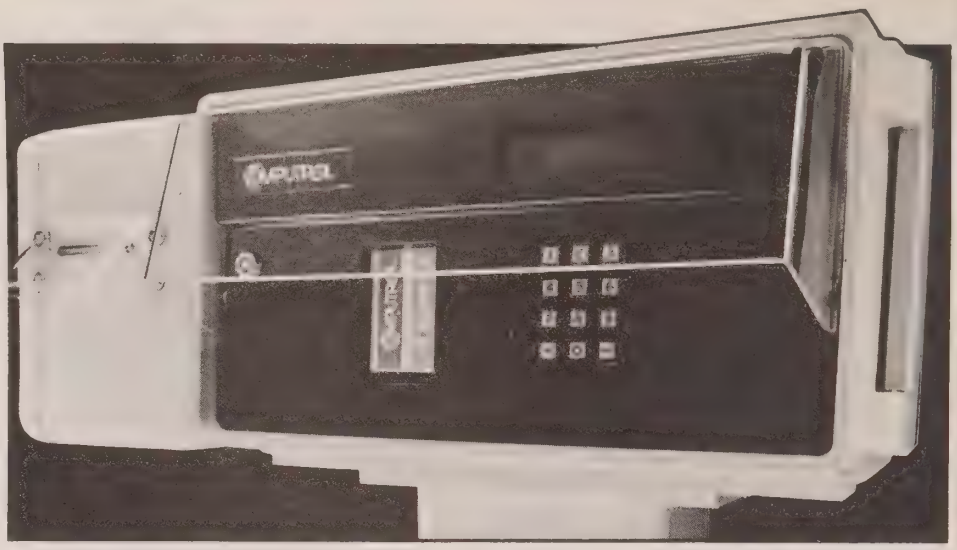
continued . . .

Property confirms that "the cards really work well. All in all the system is pretty good," he added. The Parks and Property garage decided to switch to an automated fuel system to eliminate the need for an employee at the pumps. The system was installed one and a half years ago and cost about $5,000 at the time of installation.

Computrol's Fleet 600 is a popular municipal model. The unit manages four pumps and costs approximately $8,000. Computrol also sells software packages for generating management reports. This software allows the user the opportunity to control his own reports, using computer equipment that the municipality already owns. The Computrol package can also be interfaced with fleet management systems to provide information for their reports. Mr. John Burgess at Computrol can be reached at (416) 492-1480 for additional facts about the system.

Gilbarco Canada Inc. is new in the Canadian arena, only beginning their marketing push in February of this year. The Gilbarco system uses magnetic strip cards and offers extensive reporting functions. The package includes a powerful microprocessor for generating report information, and therefore, the base cost for a four-pump system is somewhat higher. The Fleet Manager 2 controls a four-pump network and costs approximately $15,000. Mr. Kim Hansen at (416) 745-3111 would be happy to provide more information.

Municipalities interested in purchasing a fuel-dispensing system should shop competitively. Some systems may be too comprehensive for the foreseeable needs of a small municipality; some may not have the capacity needed for a large organization. If your municipality is considering an automated dispensing system you may wish to consult others in your area who are using a particular system. The companies named in this article will be able to provide the name of a client in your area.



Computrol C600 Pump Control Unit

Fuel Sensor

A new fuel-level sensor by Veeder-Root is a useful addition to any fuel system. The automated sensor continuously monitors the fuel level, water level, and temperature in underground storage tanks. In addition, the system contains alarms for theft, leaks, overfill, low fuel level, and high water level.

The tank level sensor saves the loss of valuable fuel by detecting leaks and thefts so that they may be prevented. The system also helps to maintain control of inventory during shift changes and after the purchase of fuel. The information provided by the system is printed on a small, tape-fed printer for a permanent record.

One fuel inventory package can monitor up to eight tanks and costs $3,400 for the console and printer, plus $1,260 for each tank probe.

Upcoming Issues

Pavement management systems are designed primarily to provide a planned approach to the funding of road maintenance. These systems involve the analysis of pavement sections according to surface, road base, subgrade, and age. The analysis can be conducted by electronic equipment scanned over the road surface, by the naked eye, or by a combination of these two.

The data collected by a pavement analysis are used in setting priorities for road repair, deciding the type of maintenance, and determining the highest possible road service level for a set road maintenance budget.

In the next few newsletters we plan to profile some popular pavement management systems available in Ontario. We hope this review will help your municipality decide if managing pavement can save energy and money.

If you'd like to receive this newsletter, or know someone who would, please fill out this form and mail it to:

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TRANSPORTATION ENERGY NEWSLETTER

MTEAC

Winter 1987

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES, AND THE PROVINCE OF ONTARIO

Vol. 5 No.4

Municipal Pavement Management

As serviceability of pavement declines, maintenance costs increase. A successful pavement management program ensures that the most cost-effective maintenance and/or rehabilitation treatment is selected and implemented at a time when a municipality can derive the greatest benefits. The basic purpose of pavement management is, therefore, to achieve the best value possible from public funds allocated to providing roads for safe and economic transportation.

The Pavement Management Program

A pavement management program consists of a comprehensive, co-ordinated set of activities associated with planning, design, construction, maintenance, evaluation, and research of pavements, in which investment alternatives at both network and project levels are optimized.

At the network or program level, roads are assigned priorities for maintenance and rehabilitation on an objective, cost-effective basis, providing needed information for long-term financial planning and budgeting.

At the project or design level, design alternatives are compared to determine the most cost-effective rehabilitation strategy for each road section identified as a priority at the network level.

Functions

A pavement management program should provide a municipality with a number of functions:

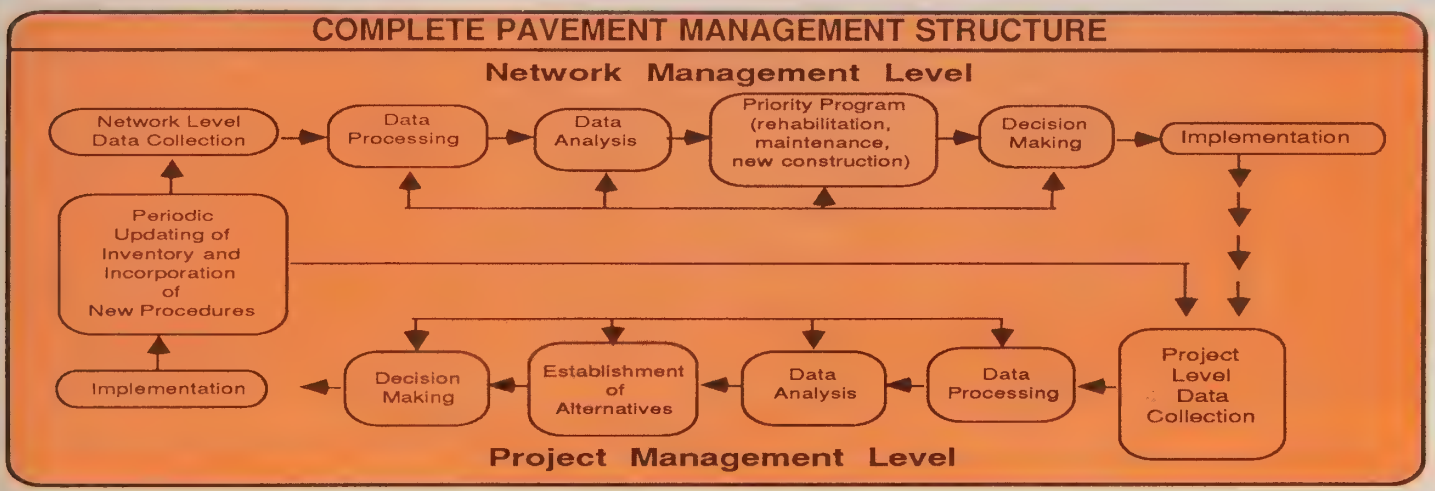
- a computerized inventory of pavements, with road sections identified by physical objects (i.e., town lines and intersections) arranged in descending order of need for rehabilitation and maintenance;
- a list of suitable treatments for maintenance and/or rehabilitation within a planning period, for each section, and an evaluation for cost-effectiveness and timing of treatments;
- ability to predict the future performance of each roadway section and thereby determine annual improvement needs;
- an evaluation of the impact of funding constraints on future road conditions;
- an assessment of the future funding requirements to bring the current road conditions to a desired level within a projected time span.

The Implementation Plan

A municipality considering use of pavement management must first decide what it expects from the program. An implementation plan is used to establish the tasks to be completed by the contractor or in-house staff for urban and rural roads at the network level and those needed for further detailed project management.

The following tasks should be implemented:

- survey of pavement condition
- inventory, providing input to a pavement improvement program
- economic analysis
- project testing and design
- co-ordination of works program



The Survey

The foundation of any pavement management program is the establishment of a relative data base of existing pavement conditions. A survey is first required to determine these conditions. Conventional manual field survey methods have been augmented by acoustic, laser technology, and computerized equipment.

Pavement condition surveys are supplemented with the dynaflect, a device that offers a non-destructive technique for identifying structural weaknesses. The dynaflect basically consists of a dynamic cyclic force generator mounted on a two-wheel trailer. Cyclic force is generated by a pair of unbalanced fly wheels, which rotate in opposite directions. This produces a cyclic vertical force of 453.6 kg (1000 lb) on the loading wheels. The resulting deflections are detected by the five velocity sensors or geophones, each 30.48 cm (12 inches) apart, on the pavement surface. The deflections are combined with mathematical formulas to analyze pavement condition.

Surface defects can be accurately and quickly determined through the use of a van equipped with laser cameras that operate at a speed of 32 000 readings per second. Survey measurements are processed simultaneously and recorded on magnetic tape for direct computer input. Such technology has the advantage of providing a high level of repeatability not obtainable through subjective survey techniques.

Recording computer readings

The dynaflect in operating position

The Inventory

When an inventory is developed, the road network is divided into a number of sections. Three indices are combined into one value to produce a rating that represents the overall condition of a pavement structure:

- distress condition
- adequacy rating
- quality index

The distress condition for each pavement section indicates surface defects such as potholes and cracking. An adequacy rating reflects the ability of the section to carry the anticipated traffic. A quality index portrays the user's perception of road quality for a section.

The Pavement Improvement Program

The results of the inventory are used to develop a list of priority projects for maintenance and rehabilitation. Mathematical optimization techniques may then be employed to plan a pavement improvement program, based on a given budget scheme, for up to a 10-year period. The program can specify which sections to rehabilitate, the year in which rehabilitation should proceed, and the type of rehabilitation strategy likely to be employed.

Economic Analysis

Selection of treatment for each project is made from a number of different alternative treatments, based on economic analysis, and evaluated by using a measure of cost-effectiveness. At the network level, all systems use average construction costs based on client data available from previous contract or direct labour work. At the project level, alternatives are considered in more detail.

Project Testing and Design

Project testing and design commence when a maintenance and rehabilitation plan has been established. Data may need to be obtained from cores and deflection testing. Where projects require such data for design purposes, the data requirements can be specified in terms of the following items:

- sampling frequency
- time of testing
- traffic control requirements

Program Co-ordination

Co-ordination with other programs for structures, sewers, and utilities can proceed when all needs have been assigned priorities and consideration has been given to the

Continued on page 4

An Overview: Road Construction and Maintenance

Former Practices

Pavement construction and maintenance has been affected by a rise in cost of energy sources, labour costs, and raw materials. This trend has caused increasing interest in the development of saving techniques to maintain current road standards.

Road construction in the 1960's was strong due to a stable economy and an abundance of energy supplies. Yet, with the onset of the 1970's, oil embargoes sent prices in a rapid, upward trend. Consequently, economical means of road maintenance became necessary to maintain quality roads.

Road repair

Current Construction Practices

In less than 20 years, road construction costs rose from $3.9 million in 1967, to $1.5 billion in 1985, a profound increase, despite changes in the world's economy and the construction world. With increasing costs, decreasing funds are available for construction and repairs. This has resulted in the promotion of new practices, such as pavement recycling, improved road maintenance, and asphalt substitutes.

One device created specifically to reduce asphalt amounts and save energy is the pavement recycling machine, designed to remove old asphalt and, after some initial processing, relay it as new pavement.

As an asphalt recycler, it saves on oil costs as it reuses the old asphalt instead of having to use entirely new and expensive resources. Savings also result from the use of propane-fuelled recycling machines. As a cost-efficient device, this machine results in

- overall savings between 20 and 60 percent
- overall energy savings of 45 to 80 percent
- more durable surface pavement
- less time spent repairing road surfaces
- reduced labour costs
- reduced traffic disruption

ROAD SAFETY AND ENERGY EFFICIENCY

Driving Tips	Instructions	Advantages	Fuel Savings
Warm up for winter	Use a block heater for 1-2 hours.	• Reduces engine wear • Reduces warm-up time • Reduces pollution • Easier starts • Prevents stalling	4-11% (short trips will see bigger savings)
Idling gets you nowhere fast	When stopped (except in traffic) turn engine off.	• Reduces engine wear • Reduces pollution • More than 10 seconds of idling uses more fuel than restarting engine	approximately 14%
Use radials	Use P-metric-sized radial tires. Remove snow tires when safe to do so.	• Improves performance • Longer wear	7%
Inflated tires	Keep tires inflated to recommended air pressure. Check air pressure at least once a month.	• Tires properly inflated will improve handling (i.e., braking and steering) • Longer wear	1% more fuel consumed for each 2 psi (14 kPa) under maximum
Constant speed	Drive in 60-75 km/h speed range where possible.	• Most fuel-efficient speed • Small reductions in speed will have almost no effect on travel time	Fuel consumption at 115 km/h is 25% higher than at 90 km/h
Easy on the brakes – anticipate	Look ahead and reduce brake use by anticipating traffic and road conditions. Keep eyes on the road. Avoid abrupt stops. Prepare for what's ahead.	Saves fuel	

For further details, please refer to the DriveSave pamphlet "DriveSave Fuel Economy for All Seasons"

Overview *continued*

Another cost-efficient idea has been the concept of improved binding materials. Research on different forms of asphalt substitutes has produced mixes containing new ingredients, such as sulphates and plastics, each product being compared for durability and life span. With a superior quality binder, the number of repairs needed will be reduced.

Recommendations have recently been centred on the improvements of road maintenance. Studies have shown reduction in salting could possibly reduce wear because it is a highly corrosive material. Unfortunately, doing so would result in a higher accident rate and higher fuel consumption. Therefore, the area of expense would merely be replaced, not actually reduced.

Since this is an ineffective method of cost reduction, techniques for winter maintenance have also been considered. Measures such as building sideslopes and using higher snow fences to reduce drifting are being tested. Evidently, planning to prevent unnecessary maintenance can result in easily saved dollars.

A more detailed description of cost-efficient methods for road maintenance will appear in the next issue of the newsletter.

Some Facts

- The average Canadian fleet vehicle is driven 3093 km/month.
- 2562 of those kilometres are for business, and 531 km are for personal use.
- The average Canadian fleet vehicle is kept 33 months or 80 435 km.

Please note that the MTEAC newsletter is now a seasonal rather than quarterly publication.

The MTEAC newsletter is a publication of the Transportation Energy Management Program (TEMP), produced by the Ministry of Transportation and Communications in cooperation with the Ministry of Energy.

MFMIS Seminars

The Transportation Energy Management Program (TEMP) has recently completed a series of seminars introducing Ontario municipalities, transit agencies, and local utility companies to the Municipal Fleet Management Information System (MFMIS). Seven seminars were held across the province, attracting approximately 200 people.

A new document, "MFMIS System Description and Implementation Guide," was recently made available by TEMP. The book describes the function and capabilities of MFMIS, particularly the input requirements, report functions, and means of operation. A detailed description of the implementation process is also provided.

For copies of this guide or the complete information package, please contact
Municipal Program, TEMP
Room 324, Central Building
1201 Wilson Avenue
Downsview, Ontario
M3M 1J8
(416) 248-7296

Municipal Pavement *continued*

apportionment of funds in the overall works budget. Work plans for other program items, such as structures and sewers, should be made to interact with pavement management plans to avoid cutting into recently rehabilitated pavements.

A number of different approaches to pavement management have been developed and marketed by consultants throughout Ontario. In the next issue of the newsletter, some of the more popular pavement management programs in use by various municipalities will be profiled.

If you'd like to receive this newsletter, or know someone who would, please fill out this form and mail it to:

Frank Cherutti
Executive Secretary
MTEAC
3rd Floor, Central Building
1201 Wilson Ave.
Downsview, Ont.
M3M 1J8
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Ontario
Ministry of Transportation and Communications
Hon. Ed Fulton
Minister

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Hon. Vincent G. Kerrio
Minister

This issue was written by Christine Forker

ISSN 0226-9384

Energy Ontario

TRANSPORTATION ENERGY NEWSLETTER

MTEAC

Spring 1987

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES, AND THE PROVINCE OF ONTARIO

Vol. 6 No. 1

Energy: A Recap of 1986 and a Look Ahead

An examination of the past year's energy situation provides the basis for reasonably accurate predictions for the year ahead. In a country rapidly depleting its non-renewable resources, all indicators point toward the need for conservation.

The past year was marked by erratically fluctuating oil prices and general disruption in the oil industry, which experienced significant profit decreases as well as oil revenue and investment losses. This was caused by conflict within the Organization of Petroleum Exporting Countries (OPEC), and resulted in an oversupply of oil. Consequently, crude oil prices dropped by more than half, with devastating results.

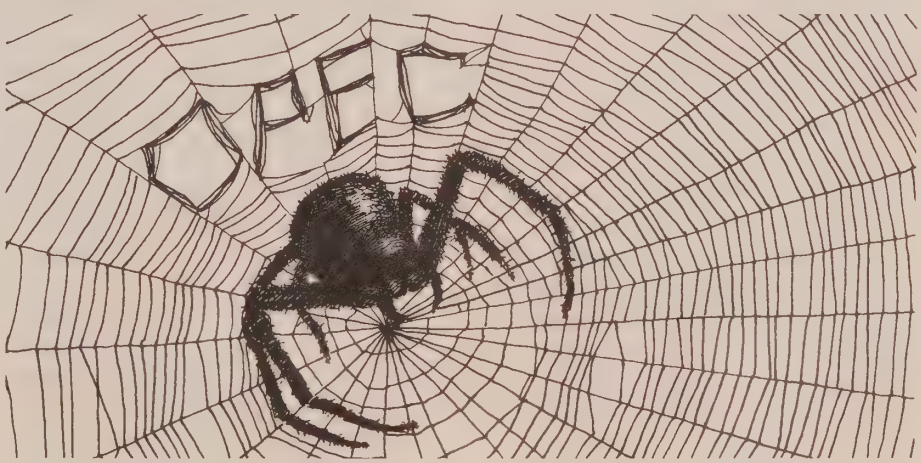
In Canada, the already high costs of exploration and production, combined with falling oil prices, discouraged capital spending by $3.5 billion, or one-third. The number of operational gas and oil wells in Canada dropped to 6400, approximately half of the 1985 total. Individuals also experienced the crunch through the loss of 50 000 petroleum-related jobs. Perhaps the most harmful impact for Canada was the unavoidable suspensions or deferrals of the tar sands projects and development of the frontier reserves. Drilling was virtually halted off the East Coast and was suspended in the Beaufort Sea. Fortunately, early in 1987, Gulf announced its intention to resume drilling in the Beaufort Sea.

As the situation now stands, OPEC still holds a smaller market share than in previous years because of its numerous competitors. However, experts predict a gradual increase in its influence as development and exploration by oil companies elsewhere decrease. This reduction in competition will allow OPEC to regain the dominant world market position it once held. For now, OPEC's member nations have agreed to raise world crude oil prices to the optimum $18 to $20 per barrel.

The possibility of further oil price disruptions in Canada remains as long as we continue to depend on OPEC for nearly 20 percent of our imported oil supply. Although Canada holds substantial crude oil reserves, if a severe shortage were declared by the International Energy Agency (IEA), we would be obliged to share our supplies with the 20 other IEA member countries. Such a shortage could result, for example, from a blockade of the politically unstable Persian Gulf through which a significant amount of IEA's oil must pass.

There is a danger that many transportation companies and large fleets will base decisions for the future on today's lower oil prices, downplaying the need for conservation. However, now is the best time to take measures toward conservation, while the market is at a pricing low. Today's decisions will affect energy costs for the next 5 to 10 years. Because Ontario is the largest consumer of transportation energy (35.76 percent of the total used in the country), the potential savings and benefits of oil conservation would have the most impact here. Ontario's transportation sector consumes 70 percent of the province's total refined petroleum products, and this is the sector in which conservation measures have been especially concentrated.

continued . . .



"Come into my parlour," said the spider to the fly. "Start buying those 8-cylinder guzzlers again. Stop those ridiculous, outdated fuel-conservation programs. There's plenty of oil. Embargoes? Never! Come on in . . . the glut's fine."

Pavement Management:

Niagara Region: IMS Ltd.

Infrastructure Management Services Ltd. (IMS Ltd.) is currently providing the Niagara Region with a pavement management system capable of providing the data necessary for assessing a roadway's condition within a specified time span.

A review of the condition of Niagara's regional road system indicated the need for a pavement management program. The study showed that approximately 36 percent of Niagara's 960-km road system is subject to load-limit restrictions. Some of these roads have year-round limitations at the five-tonne-per-axle limit and are considered unsuitable to accommodate heavy truck traffic without risk of severe deterioration. A significant percentage of other flexible pavements has shown visible surface distress, resulting in considerable pothole development and increased costs for surface maintenance.

In August 1983, road maintenance staff received authority to proceed with the implementation of an American Public Works Association (APWA) paver system to determine surface condition and pavement evaluation. In 1985, Niagara hired Infrastructure Management Services (IMS Ltd.), who ensure accurate survey measurements and determine the structural capacity of pavement.

Typical spring breakup

IMS Ltd. offers six benefits applicable to Niagara's situation:

- commitment to completion of field-data collection and installation of the software program over a three-month period;
- non-destructive testing using the Dynaflect;
- staff training for the use of specific programs available under the software package;
- ranking of road conditions by area and municipality to establish priorities for pavement maintenance or rehabilitation, and to establish pavement condition ratings for all road sections;
- development of unit costs reflecting Niagara's resurfacing and reconstruction strategies;
- development of unit costs associated with damage and subsequent reconstruction caused by heavy truck volumes.

Niagara will also benefit from the current liaising of IMS Ltd. with the Ministry of Transportation and Communications. The liaison allows for the development of additional IMS modules without incurring additional costs. The program is tentatively scheduled for completion in 1988. The five-year rehabilitation program to maintain Niagara's regional road system at the current average condition will cost an estimated $72,000,000.

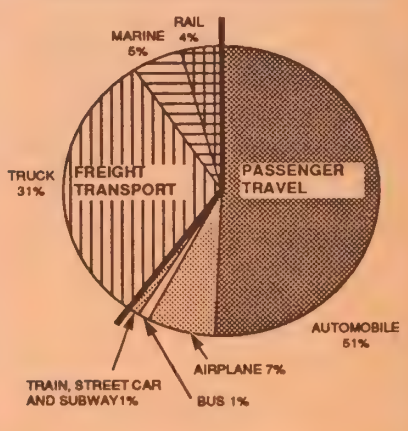
. . . continued

Canada's Energy Future

A look at the National Energy Board's predictions for Canada's energy supply up to the year 2005 provides a convincing argument in favour of conservation. The board predicts a 60 percent decline in Canada's light oil production capacity if oil prices remain low. This means that, by the year 2005, two-thirds of Canada's light oil requirements will be supplied by foreign countries. If prices rise, production in Hibernia and Beaufort will increase, and, to a limited extent, the refining of heavy oil and bitumen into light oil will increase. Despite these positive actions, Canada will still be required to import 40 percent of its light oil needs, and Ontario may be importing light oil as early as 1992.

It is predicted that OPEC's share of the world oil market will increase in the 1990s as non-OPEC oil production declines. Because more than half of the world's known producing oil reserves are in countries adjoining the Persian Gulf, Canada and the rest of the world will inevitably become more dependent on the politically volatile Middle East.

Transportation Uses of Energy



Source: Ministry of Energy, 1986

The Municipal Experience

MUNIPARS

MUNIPARS is a pavement management system offering numerous options to the user. On the basis of specific data input, the system provides key information about financial and program planning. MUNIPARS also offers the option to modify the program for a particular municipality's needs.

The Municipal Program Analysis of Rehabilitation System (MUNIPARS) was developed by the Ministry of Transportation and Communications (MTC) for use by Ontario municipalities. It is an offshoot of MTC's Program Analysis of Rehabilitation System (PARS), which is used in the planning of rehabilitation strategies for the provincial highway system.

MUNIPARS was developed in association with the city of St. Catharines as a pilot study between 1982 and 1984. Although the system reflects many local conditions, it can be modified to accommodate particular situations in other municipalities.

As with most pavement management systems, MUNIPARS requires information on the status of specific pavement sections:

- traffic volume
- road base
- time of last rehabilitation
- level of service required based on pavement condition.

MUNIPARS is separated into two forms of network planning: program planning, which selects projects appropriate to current budget levels; and financial planning, which determines funds required to achieve a desired level of performance.

The MUNIPARS system is available in two software modes: Mode A does not allow any program changes and is available at the Downsview Computer Centre (DCC) only. Minimum consultation, an operational manual, and access to IBM operational manuals are provided. The user may access the program and utility libraries.

Roy Lefevre of the Municipal Roads Office working on the MUNIPARS system

Mode B differs somewhat from mode A in that the user purchases the program for a $250 fee. As owner of the program, the user may make modifications to suit the municipality's particular needs. MTC does not provide staff for implementing program changes. However, technical or production consultation and support are available for systems located in Downsview only. An outline of the installation procedures also comes with the program. The user must obtain a FORTRAN compiler and MPSX370 utility program for operations at facilities other than the DCC. FORTRAN source programs and MUNIPARS documentation are provided.

The user is required to provide data entry and production support in both cases. Both modes come with a sample job control language deck, sample data files, and a sample benchmark run. It is advisable to consult MTC's municipal roads office regarding operational specifics before starting work activity.

The Ministry of Transportation and Communications, in association with R. Deighton & Associates, has prepared a *User's Manual and Operations Guide for MUNIPARS*. A copy of this manual can be obtained, free of charge, by contacting:

Mr. Roy Lefevre
Head Program Dev. & Evaluation
Ministry of Transportation
and Communications
Municipal Roads Office
3rd Floor, West Tower
1201 Wilson Avenue
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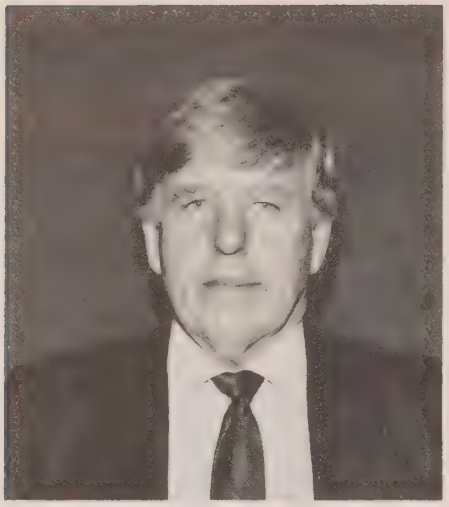
The MTEAC newsletter is a publication of the Transportation Energy Management Program (TEMP), produced by the Ministry of Transportation and Communications in cooperation with the Ministry of Energy.

Chairman's Message



Don Redmond, City Engineer
Sault Ste. Marie

Since the inception of MTEAC in 1979, interest in developing and implementing transportation-related conservation measures has roughly paralleled the world price for oil. Rising world oil prices in the latter part of the '70s and the early '80s led to the inception of both TEMP and MTEAC and sustained interest in this area. With oil prices decreasing in the past few years, I believe it fair to say that general interest in transportation energy conservation has declined. However, the one thing that has been learned and remained constant during these periods of interest swings is the realization of the importance of energy conservation as a management tool. Given the present world situation as it relates to oil supply, the trend toward increased oil prices, and our present Canadian position with respect to exploration, I feel the work MTEAC has done and is continuing to do will play an important role in our immediate future.

Let me review briefly some of MTEAC's past accomplishments and turn to our future plans. MTEAC has been involved in numerous endeavours related to reducing energy costs and municipal transportation budgets, including the following:

- the provision of seminars across the province disseminating data and information on innovative methods for reducing these costs;
- promotion of various programs such as the drive propane demonstration program, the municipal driver-training program and others;
- the development and publication of the *Transportation Energy Analysis Manual* (TEAM);
- more recently, the development and implementation of the municipal fleet management information system (MFMIS), now being adopted by a number of municipalities;
- MTEAC's transportation energy newsletter, published quarterly, has been well received as a source of topical information.

MTEAC will continue in 1987 in a number of the areas described above, such as promotion of the MFMIS and publication of the MTEAC newsletter. Training courses for municipal personnel based on TEAM are being planned. Integration of an energy component into the proposed computerization of the road needs study will be given a high priority as well as support for an integrated traffic systems study.

We cannot become complacent in the area of transportation energy management and have an ongoing responsibility to our municipalities to provide both technically feasible and financially sound advice in this most important area.

The Economy Challenge is On! Economy Challenge is an annual competition in which professional drivers match their fuel-saving skills in various vehicle categories, such as tractor-trailer vans, flatbeds, tankers and dump trucks.

The competition runs from August 11 to October 8, 1987, with the following schedule:

Truck Stop	6:00 am - noon	6:00 pm - midnight
Winnipeg to Kenora	Aug. 11-14	Aug. 17-20
Milton to Chatham	Sept. 8-11	Sept. 14-17
Bowmanville to Joyceville	Sept. 21-24	Sept. 28-Oct. 1
Joyceville to Bainsville		Oct. 5-8

Trucks leave from either truck stop on the designated route according to the dates and times listed above.

Last year's Northern Route has been replaced by the Interprovincial Route, a 193-km jaunt between Winnipeg, Manitoba and Kenora, Ontario. This new route will be co-sponsored by Pro Trucker, the federal equivalent to Trucksave.

A major change in the regulations this year is an increased minimum speed. This will add to the spirit of the challenge while providing stiffer competition for some of the best trucks and drivers in Ontario.

For more details on how to enter or sponsor the event, contact Economy Challenge Co-ordinator Terry Short at (416) 235-5026.

If you'd like to receive this newsletter, or know someone who would, please fill out this form and mail it to:

Frank Cherutti
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3rd Floor, Central Building
1201 Wilson Ave.
Downsview, Ont.
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Ontario
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ISSN 0226-9384

MTEAC NEWS

Summer 1987

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES AND THE PROVINCE OF ONTARIO

Vol. 6 No. 2

Technological Breakthrough in Pavement Management

One of the most frustrating things about summertime driving, be it on the highway during rush hour or in the city at mid-day, is a traffic jam caused by road crews at work on major repairs. If pavement damage can be detected before it becomes unacceptable and needs major work, our ever-increasing traffic problems could be alleviated to some degree. MTC has become the first Canadian owner of a new piece of technology that could speed up the evaluation of pavement conditions. It is called the ARAN, for Automatic Road Analyzer.

The ARAN system provides in-depth evaluation of pavement conditions. It is a planning tool that tells pavement management personnel when to undertake repairs, what repairs are needed and what they can cost.

The ARAN is a standard mini bus or van equipped with ultrasound transducers, gyroscopes, accelerometers, video cameras and a microcomputer system. These various data-gathering instruments measure road surface conditions such as pavement roughness, longitudinal grade, rut depth, transverse profile, and curve radius – all while travelling at highway speed. A front-mounted video camera takes pictures of the entire right-of-way and a rear, down-looking camera records the pavement distresses.

Inside the vehicle, there are video monitors that display the data being gathered, and two keyboards on which the operators can input additional information regarding the physical features of the road and pavement condition indicators, such as driveway entrances.

The ARAN is a standard mini bus or van equipped with sophisticated data-gathering instruments.

The data is stored in the computer and can be analyzed completely back at MTC's Downsview headquarters on two data processing consoles, a data reduction console and a video processing console, incorporating microcomputers and video players. The office equipment displays and prints the results of analyses and is used to prepare reports on the condition of highways and roads, predict pavement performance, plan the program and set priorities for pavement rehabilitation and maintenance.

MTC pavement management engineer, Anand Prakash, of the Highway Design Office, Highway Engineering Division, says that the ARAN will improve the overall program of pavement evaluation including surveying, engineering design, research and inventory applications. Not only does this state-of-the-art technology provide a comprehensive picture of pavement deficiencies, it helps to plan the solutions.

Developed and marketed by Highway Products International (HPI) Inc. of Paris, Ontario, the ARAN is, in the words of HPI President Don Kobi, "a total turnkey product."

Computerized road analysis was virtually an untapped market until 1978 when Don Kobi, a civil and aeronautical engineer, started developing the ARAN. He realized that highways all over North America were wearing out, and that a computerized system

continued on back page . . .

Implementing Computerized Management Systems

With computerized management systems proliferating in municipal operations, fleet managers, municipal officials and data processors are experiencing remarkably similar problems as they set about the critical organizational task of choosing and implementing a system.

Whether you are implementing a computerized municipal maintenance management system, a vehicle and equipment management system, a pavement management program, or an assets/inventory system, there are certain common problems you can expect to encounter. The following solutions to these problems are based on MTC's experience with the municipal fleet management information system (MFMIS) and the comments of other people who have implemented similar systems.

Before setting up a computerized management system, consider some key questions:

- Why do you want the system?
- What do you expect it to do for you?
- Where do you expect it to take you?
- When do you want to be there?
- Who is going to take you and the system to that point?
- How is he or she is going to do it?

The answers to these questions will provide a good foundation on which to build your computerized management system.

Personnel adjustment problems are the most common difficulty.

Problems and Solutions

Input of Base Records

The success of any computerized management system depends on the data it uses. The suitability and accuracy of the data is a direct result of the input supplied by the users.

The initial data collection is an important step that must be handled by the main users and checked by an individual with knowledge of the equipment. The data must be complete (i.e., no guessing) and accurately input. Try to keep data entry forms to a minimum length (ideally one page) and place the information on the form in a logical order to speed data entry.

Information Overload

This can be controlled by the system you select. You only want information that you specifically request printed or displayed. A system that cranks out everything it knows wastes your time and effort because you won't read it all and you won't know what is important and what isn't.

Disgruntled Employees

Personnel adjustment problems are the most common difficulty encountered. It is a changeover to something radically different and perhaps initially confusing. Make a point of including as many personnel as possible in the initial planning and decision-making process. This way, everyone will feel that the new system is a tool for his or her use, rather than something arbitrarily imposed by management.

Insufficient Computer Knowledge

Contemporary computing hardware is simpler than you may expect. To operate most systems, users don't have to know much about computers and they certainly don't have to understand them. A short computer course that teaches the basics could be useful and most companies include a training package with the software they sell. But the most useful training aid is a generous amount of time with lots of "hands on" learning for operating personnel. Also, where feasible, provide each operator with his or her own terminal.

Lack of Understanding of the System

Select a system that is easy to use and understand. Remember, the system is only an aid and the computer is only a tool; both help you make your decisions on the most appropriate action. Menu-driven systems with a well-written user manual will be much easier to learn.

Once the system is installed, provide a period of parallel operation during which the manual and computerized systems operate side by side. This should ideally continue until users are satisfied that the computer system is as good or better than the old manual method, but practical considerations generally require the designation of reasonable time deadlines.

continued . . .

MTEAC Survey Results

MTEAC administered a survey this past January to 187 municipalities across the province to provide information that will help in the development of future provincial-municipal initiatives in the area of transportation.

The results – with an encouraging 68% response rate – are now in and are being analyzed and tabulated. We will report in more detail on the results in a future issue of *MTEAC News*. Mailing packages are being prepared for respondents who requested some of our publications and information on transportation-related issues.

In addition to revealing which transportation issues are most important to the municipalities, who reads the publications produced by the Municipal Energy Program, who uses the Transportation Energy Analysis Manual (TEAM) and the driver training material, the survey provided valuable feedback for the editors of *MTEAC News*.

We sincerely thank all those who took the time to participate. The results will give us excellent information on which to base the future direction of the Municipal Energy Program, TEMP projects and *MTEAC News*.

Survey Feedback

- 33% of the respondents said they have taken action on a project as a direct result of information obtained from *MTEAC News*.
- 71% of the respondents said they like the format of *MTEAC News*.

The following are the 10 top subjects respondents felt the newsletter should address:

1/ User cost of "poor" vs "good" roads
2/ Diesel vs propane fuel cost analysis
3/ Information on driver training
4/ Actual statistics on fleets using alternative fuels
5/ Information on vehicle spec'ing
6/ Information tailored to small municipalities
7/ Results from "before and after" studies
8/ Success of MFMIS
9/ Actual results of natural gas vehicle tests
10/ Traffic and energy relationships

. . . continued

Extra Time Requirements

Initially, expect that extra time will be required to get the system going. However, as users establish a routine, they will actually save time and improve the efficiency of their work by using the system. For example, less time will be spent searching for information and checking past records, stock, etc.

Fitting the System into Your Operation

Select a system that either resembles your current operation or can be easily altered to suit your needs. Countless municipalities have purchased software systems of one sort or another that they have never been able to use because the software required a method of operation that was too different from the way they had been operating for the past ten years.

Lack of Responsibility to the System

Designate someone in your municipality with authority and respect to be in charge of ensuring the system is implemented and used to its full potential. This person must also be able to answer questions and solve problems regarding the system. Encourage staff participation in system improvements by making available appropriate training and computer time, as well as some designated disk storage space on which to experiment and develop their ideas on system improvements.

Lack of Commitment to the System

Let senior management make clear their commitment and enthusiasm for the new system. This will provide the necessary thrust for implementation, cooperation from staff and other departments, and the authority to provide the necessary training for backup and support staff.

Management should make clear to all personnel that:

- The system will not replace anyone; it is here to make the operation more efficient.
- The system will not measure employee skill but rather help better utilize money, time, equipment, supplies and staff.
- The system is here to provide advice and support our operation. Staff still make the final decisions because no computer can learn the business as well as people can.

Update on the MTEAC Newsletter

Over the last five years, this newsletter has concentrated its efforts on articles that were specifically related to energy conservation measures in transportation. Due to a changing climate in the energy sector, a decision has been made to include more articles on management and efficiency in transportation-related municipal operations.

We believe that good management practices, combined with efficiency in operations, will lead to a reduction in energy consumption. An example of this relationship is the municipal fleet management information system (MFMIS). Improving the management of municipal vehicles and equipment, and the efficiency of their utilization, brings about definite benefits, one being energy savings.

We still intend to present articles on transportation-energy issues, such as new energy-related ideas, technologies or equipment, and any energy conservation items that may be of interest to you.

We would like to invite interested municipalities to submit transportation-energy or management articles to the MTEAC editors for publication. We are particularly interested in articles reporting on municipal maintenance and fleet or pavement management systems. Please submit approximately 1000 words along with photos, tables and/or graphs. We would also like to hear from you on the topics you would like to see in future newsletters. Your input will help us to keep you informed.

The MTEAC newsletter is a publication of the Transportation Energy Management Program (TEMP).

Ontario

Ministry of Transportation and Communications
Hon. Ed Fulton
Minister

Ministry of Energy
Hon. Vincent G. Kerrio
Minister

Inside the vehicle, there are video monitors that display the data being gathered.

...continued from page 1

that could detail the condition of a highway while being driven over it was something the pavement management industry needed.

HPI has sold eight of the ARAN units so far – six in the United States, one in Italy, and one to MTC in March 1987. Available in two different-sized vans, the ARAN system costs $300,000 for the smaller version and $500,000 for the larger, but the cost varies with the options chosen.

The company also operates a unit in Paris, Ontario, as part of the service side of its pavement management business. Wellington County, the City of Brampton and the City of Etobicoke have all recently commissioned HPI to carry out ARAN surveys and install its "Pavement Expenditure Planning" software system.

The Highway Design Office in Downsview is currently testing MTC's ARAN to evaluate its capabilities and to tailor it to the ministry's operational requirements.

Following the period of evaluation and development, it is hoped that by 1988 MTC will be using the ARAN in its regular day-to-day work of evaluating and preserving Ontario's roads and related research and design activities.

If you'd like to receive this newsletter, or know someone who would, please fill out this form and mail it to:

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3rd Floor, Central Building
1201 Wilson Ave.
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MTEAC NEWS

Fall 1987

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES AND THE PROVINCE OF ONTARIO

Vol. 6 No. 3

Managing Ontario's Freeway Traffic

As freeway traffic becomes more and more akin to innercity driving, freeway traffic management systems are becoming as common as streetlights and stop signs. The notion of running the province's highways in the same regulated fashion as city streets (known as freeway traffic management) developed in the sixties when it became apparent that an efficient highway system needed to be monitored and controlled. The manifestations of this idea can be seen in the eighties in the form of changeable message signs, stop lights at on-ramps, lane-control signs and closed-circuit television cameras.

The most immediately visible aspect of freeway traffic management is the changeable message sign (CMS). It does everything from warning motorists about weather hazards to redirecting traffic during delays. The signs display messages with the "flip-disk" system, meaning they are made up of rows of disks, black on one side, yellow on the other, that are patterned to form messages. The messages are changed from a control centre that houses a mainframe computer and one or two operators.

A changeable message sign on the Burlington Skyway

Detecting the Problem

Traffic detection and observation is handled in a couple of ways. In areas where a CMS is placed, diamond-shaped wire loops are inserted below the lanes of the highway. The loop can then detect cars by magnetically sensing that a large metal object has passed over it. The freeway loops transmit their signal to a cabinet on the shoulder of the road, which contains a "signal amplifier" that sends the loop signal to the control centre computer every 20 seconds for the operator to analyze.

Once a delay or traffic jam has been confirmed by the computer, the operators can survey the nature of the problem visually, with one of many closed-circuit television cameras which are placed along the freeway on 50-foot posts, at a frequency of about one every kilometre.

Remeding the Situation and Advising the Motorist

When a delay, accident or hazard is confirmed, the control centre can then assume its advisory role. For example, fires, accidents, or spills on the highway can be quickly detected by the closed-circuit cameras.

Another important function of the control centre is to alert surrounding municipalities to the possibility that freeway traffic may be diverted into their areas, increasing traffic on the off-ramps. Municipalities can then respond accordingly by changing their traffic-light signal timing. The motorists themselves are alerted to the latest developments on the highway by radio stations that receive updates from the control centre or by warnings on the changeable message signs.

The signs that are in place now usually do not offer direction to motorists by suggesting an alternative route. Until there are enough traffic detection loops to cover a wider area, redirecting traffic might only cause more problems than it solves by steering motorists into slower traffic. However, when faced with major delays, the operators at the control centre occasionally do attempt to use the signs to redirect traffic.

Currently, the signs can effectively inform drivers whether to use the express or the collector lanes and are mainly used for warning drivers of accidents, traffic jams or weather hazards. As this technology becomes more advanced, the CMS will be capable of playing a larger role in freeway traffic management.

Contingency Planning for Oil

Why is it essential that municipal governments prepare themselves for the management of an oil shortage? Canada, as a member of the International Energy Agency (IEA), and as a net exporter of oil will be required to share its production if crude oil supplies decrease by 7 percent to one or more of the 21 IEA member countries. All member countries would have to reduce their demand for oil by 7 percent. If the shortage exceeds 12 percent, demand must be reduced by 10 percent.

While Canada currently has an abundant supply of oil, the National Energy Board (NEB) believes that by the 1990s Canada will become a net importer. By the year 2005, Canada could be importing up to two-thirds of its light oil if prices are low.

Ontario's supply of oil, most of which comes from outside the province, will be curtailed if an oil shortage occurs. All levels of government will then play an active role in managing a shortage and co-ordinating actions to ensure a consistent and equitable response. The federal government and the Province of Ontario have prepared comprehensive contingency plans and a number of municipalities in Ontario have completed their plans.

The federal plan deals with the management of supply in a severe shortage. The Energy Supplies Allocation Board (ESAB), created in 1979 by the Energy Supplies Emergency Act, is authorized to allocate crude oil to refineries and refined products to wholesale distributors and retailers. If the shortage worsens, ESAB will ration gasoline and diesel fuel purchased by retail customers.

Future oil shortages are predicted.

Ontario's oil shortage contingency plan focusses on the management of demand in order to bring it in balance with available supplies. The plan sets out the roles and responsibilities of all levels of government and the private and quasi-public sector. It identifies fuel reduction actions which have the greatest potential for reducing provincial demand. The plan is staged so that it can be responsive to any shortage, regardless of its severity or duration.

Whether municipalities have a plan in place or not, they will have to assume a major role in the management of a shortage.

The goal of the provincial oil shortage contingency plan is to maintain public health and welfare and economic stability during a period of oil shortage or perceived shortage. The major objectives of the plan are to:

- reduce demand;
- ensure public awareness, understanding and appropriate public reaction in coping with a shortage;
- maintain essential government functions;
- demonstrate effective, responsible leadership;
- assist in ensuring that shortages are equitably shared;
- ensure a co-ordinated approach among key groups.

The plan will be maintained, updated and tested to ensure that the provincial government is able to respond effectively to a shortage.

The municipal planning component was initiated by the Government of Ontario in June 1984 to help selected municipalities prepare contingency plans using guidelines developed by the province. Thirty-three municipalities have completed contingency plans under the Ministry of Energy's Municipal Contingency Planning Program. Funding was provided through the Joint Emergency Planning Program (JEPP) on a 50/50 cost sharing basis between the provincial and federal governments.

Recycling pavement saves oil.

These municipal plans represent a range of municipal types, structures and sizes including two regions, one county, eight cities, seven towns, one village and fourteen townships. The plans analyze municipal and local consumption patterns and identify measures that can be implemented within municipal operations to curtail consumption while still ensuring the provision of essential services. In municipalities with public transit services, measures are identified for meeting increased demand, improving system efficiency and curtailing consumption where feasible.

Some plans also address measures that municipalities can implement within the community, such as ride-sharing, to help residents maintain their mobility while reducing fuel consumption. A few plans identify voluntary measures for industrial and commercial firms and major institutions to help them manage the shortage and complement municipal fuel reduction measures.

Whether municipalities have a plan in place or not, they will have to assume a major role in the management of a shortage. On notification by the provincial government that an oil shortage exists, municipalities will need to take the following action:

- provide leadership at the local level;

Shortages: Municipal Perspective

- set up a municipal emergency management team to co-ordinate all services, disseminate information to the public and centralize assistance to the public;
- in co-operation with the province, take the lead and restrain demand for oil consumption in municipal operations;
- implement measures to reduce oil consumption within the municipality;
- pass by-laws, if necessary, to facilitate the implementation of these and other measures;
- ensure that vital public services such as police, fire, health and social services, public transportation, utilities, water and waste disposal are maintained.

Planning ahead will ensure that municipalities are able to react quickly, maintain essential services, meet increased demand for public transit, reduce consumption in their own operations, and help the community in the management of a shortage. Planning also ensures an efficient and effective response that is tailored to the unique needs of each municipality and is compatible with the provincial and federal programs.

Meeting a higher demand for public transportation.

All municipalities will need to identify effective measures to implement in the event of an oil shortage. The majority of these measures are aimed at the transportation sector which currently accounts for 60 percent of the total oil consumption in the province. Municipalities, for example, will be directly involved in implementing measures dealing with transit, traffic management, parking, taxis, retail shopping hours and regulating service station hours. In addition, other measures that will be implemented through provincial regulations, such as the enforcement of speed limits, the lowering of speed limits to 90 km/h or the introduction of minimum gasoline purchases, may require municipal support to monitor and enforce.

The National Energy Board believes that by the 1990s Canada will become a net oil importer.

Both the provincial and municipal demand restraint programs will be voluntary in the early stages of a shortage. Through an extensive communication program, the public will be requested to curtail consumption by switching to high occupancy vehicle modes provided by ride-sharing and public transit, by driving less and by increasing energy efficiency within existing transportation modes. Only if the situation dictates will mandatory measures be imposed. To set an example in the early stages of a shortage, mandatory measures will be imposed on government operations.

Detailed guidelines that identify all the planning steps are available to assist municipalities in the preparation of oil shortage contingency plans. The guidelines address the following planning phases:

- commitment to the development of a contingency plan by council through a council resolution;
- appointment of a technical steering committee;
- review of local resources, capabilities, staffing and funding requirements;
- preparation of a work program by the assigned co-ordinator;
- identification of goals and objectives;
- analysis of municipal services and operations, especially transit services;
- determination of opportunities for community outreach and public education;
- analysis and recommendation of realistic demand restraint options to reduce consumption in municipal operations and the community;
- identification of transit measures to meet the increased demand for public transit;
- identification of the implementation roles and responsibilities of all key players;
- development of plan maintenance, update and testing procedures;
- writing of the plan and its approval by council.

Encouraging high occupancy vehicle modes.

The Ministry of Energy will be mailing *Guidelines for the Preparation of Municipal Oil Shortage Contingency Plans*, fact sheets describing the federal, provincial and municipal contingency planning program and the *Municipal Subplan* to all municipalities. Additional copies, sample municipal plans and detailed information on measures to reduce gasoline and heating oil consumption are available from Olja Muller, Co-ordinator, Oil and Gas Section, Ministry of Energy, (416) 963-2474.

Fleet Management in a Nutshell

In this article, Bill Mocsan of the Transportation Energy Office, Ministry of Transportation, discusses the advantages of record keeping for fleet managers.

As the person responsible for the operation of the municipal fleet, you only have two objectives to meet if you want to do your job properly: to minimize vehicle costs, and to maximize vehicle availability/utilization.

To further simplify this, you could say the goal of the fleet manager is to maximize efficiency within the fleet. That certainly sounds simple, but let's take a closer look.

Efficiency, as it looks from my armchair analysis, covers six key areas. (Those of you working on the shop floor could probably triple this.)

1. Repairs
2. Preventative maintenance
3. Fuel consumption
4. Utilization
5. Replacement
6. Spec'ing

O.K., so far we've gone from two objectives down to one goal and back up to six areas of concern. Getting confused? That's understandable – fleet management isn't as easy as it seems. However, as an explanation, consider that you have to maximize efficiency in each of the six areas listed above.

How can you do this well if you have a large, diverse fleet and already feel over-worked?

The simplest way to capture the information you will need to maximize your fleet's efficiency is through record keeping, and, if your vehicle and equipment list is longer than 30 or 40 vehicles, then a computerized fleet management system might serve your needs best.

Record keeping will not only provide information on the frequency of repairs but will also help you catch

Record keeping helps the Ministry of Transportation to manage its fleets

trends in repairs, lemon vehicles and possibly upcoming problems. Records will assist in the development and operation of a preventative maintenance program for your entire fleet, regardless of the size or type of equipment you're running.

Records on fuel consumption and fuel performance will provide insight into gas-guzzling vehicles, problem drivers, or vehicles requiring a tune-up or minor maintenance. Record keeping can also lead you to the efficient allocation of vehicle utilization, help you to recognize over- or under-worked equipment and help you accurately determine actual vehicle costs in ¢/km and/or $/h. By using pre-determined replacement standards, a record-keeping system can instruct you on up-coming equipment replacement schedules and assist in determining which pieces should be replaced either on schedule or prematurely and, most importantly, help you avoid conducting major repairs to vehicles coming due for replacement.

Information accumulated on your vehicles over time can provide great insight into what you should buy next time. For example, the six pick-up trucks you bought three years ago may have been at the best price but their maintenance and up-keep made them more costly than the more expensive models you didn't buy. This type of information can lead to a more cost-efficient fleet and that's a reflection on you, the fleet manager.

Finally, a good fleet management system will:

- help you minimize costs, maximize your "spending efficiency" or, as they say in the business, get the biggest bang for your buck;
- help improve your knowledge and understanding of your fleet to minimize downtime and repairs and, ultimately, to maximize the efficient utilization of each and every piece of equipment in your entire fleet.

The MTEAC newsletter is a publication of the Transportation Energy Management Program (TEMP)

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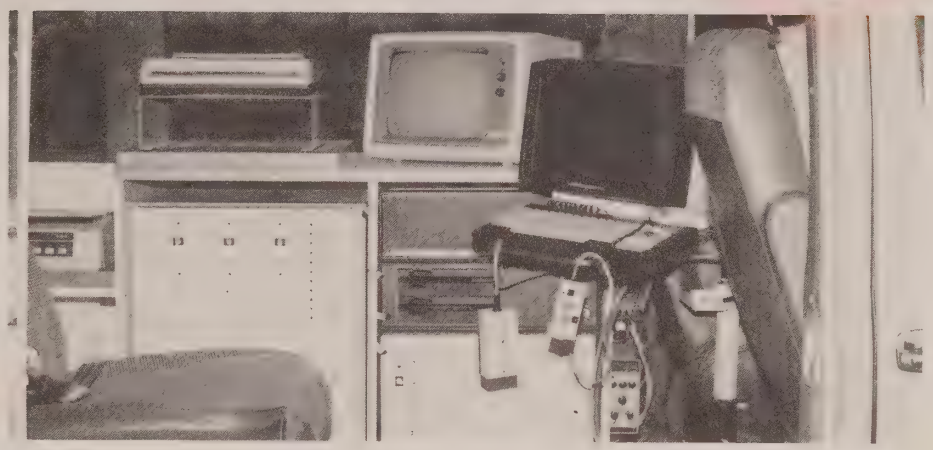
Vol. 6 No. 4

The Road to Reliable Pavement Management

This is the third installment in a series of articles dealing with pavement management systems currently available in Ontario. Previously, MTEAC dealt with the MUNIPARS system (Spring 1987) and the ARAN (Summer 1987).



The interior of an RST-equipped van.

The task of examining and rating pavement condition has taken a quantum leap in recent years. Pavement management has progressed from an entirely subjective, inconsistent process to the point where municipalities have the option of using an accurate, dependable system. The same technology that is capable of reading millions of pieces of data from a compact disc is also used to measure ruts and cracks in pavement with unprecedented accuracy. This piece of equipment, owned by Infrastructure Management Services (IMS) in North America, is called the Laser Road Surface Tester (RST).

A municipality wishing to use the RST can employ the services of IMS which include staff to operate the RST, computer software that processes the results obtained by the RST, and pavement management expertise and advice.

The Birth of an Idea

The idea for a laser pavement analyzer arose out of dissatisfaction with the lack of speed and accuracy, and the high cost, of other methods of examining pavement. The "windshield method" involves simply driving over the pavement to observe any visible cracks or ruts and rating the roughness of the ride. This information is then compiled and used to plan pavement maintenance. This method, while being fast, is inaccurate since it depends on the human eye to verify the existence of cracks that, for the most part, are not plainly visible. This problem can be compounded by weather or lighting conditions (a thin coating of rain makes asphalt look new and free of cracks). As well, two people examining the same pavement can often give different interpretations.

In response to the inadequacies of the windshield method, more municipalities began using the "walking method." This is a more accurate and reliable system, but visual inspection on foot has proven to be slow and expensive.

Then technology arrived, albeit rather clumsily, onto the pavement management scene. A "contact system" was developed that would record broad changes in the surface of the pavement by recording the distance that a piston had to drop to reach the pavement. The problem with this machine was that it tended to wear itself out quickly. The next step was to find a non-contact method of examining pavement. It was realized at this point that an effective system would have to utilize some kind of frequency beam, such as sound or light.

The first Laser RST was then developed in Sweden. By 1980 Sweden had a working model of the Laser RST testing its rural road systems. In 1983, IMS purchased the North American rights to the system and subsequently adjusted it to survey urban roads.

The Workings of the RST

The RST is a self-contained unit mounted on the front of a regular-sized van. It houses 11 lasers that

Continued on page 4

A Look at Ontario Road Safety in 1986

Each year, the Ministry of Transportation publishes the *Ontario Road Safety Annual Report*. The 1986 report is the most extensive yet, utilizing information from the ministries of Health and the Attorney General, in addition to the usual statistics obtained from accident reports. It serves as a barometer of driving habits within the province, providing insight into how driver education, and the highway and city driving environment can be improved.

Drinking and Driving: Still Ontario's Main Concern

During the summer of 1986, Ontario stepped up its campaign against drinking and driving. Over the months of June and July, the Ministry of Transportation loaned its support (along with Transport Canada, the Addiction Research Foundation, the Ministry of the Attorney General, and the Ministry of the Solicitor General) to a survey conducted at 289 sites across the province. At these sites, municipal police officers stopped over 12,000 vehicles from Wednesday to Saturday nights, between the hours of 9 pm and 3 am. The information gathered from questioning the drivers included: the reason for being on the road, the age of the driver, opinions on drinking and driving and seatbelt use, and personal drinking habits. In addition, a breath sample was analyzed to determine drivers' blood alcohol concentration (BAC).

Results revealed that around the time of 1 or 1:30 am, over a third of the drivers on the road had either been drinking (BAC of .02 to .08) or were legally impaired (BAC over .08). This is also the time when most alcohol related fatalities occur. In 1986, 72.4 percent of the fatal car crashes that occurred between 1 and 2 am were alcohol related, as were 91 percent of the single vehicle accidents during the same time period. All in all, 46 percent of the drivers killed in 1986 were in alcohol related accidents. Twenty-seven percent of the pedestrian fatalities had to do with drinking and driving as well.

These statistics are shocking when you consider the number of cars displaying "Don't Drink and Drive" stickers and the constant anti-drinking and driving message in the media. However, efforts of the police, community groups, and the media have had a tangible effect on driving habits over the past decade. In 1957, the number of alcohol related crashes per 100,000 licensed drivers was 459; the highest number was recorded in 1974 when it was 787; in 1986 it reached its lowest point in years: 302. This shows that, although the problem is not solved, it is definitely on the decline.

High Risk Categories

Age groups prone to accidents have not changed significantly over the years. As any insurance agent will tell you, people between the ages of 20 and 24 are at the highest risk of being involved in a car accident. In 1986, this age group, which makes up 11.65 percent of licensed drivers in Ontario, was involved in over 18 percent of all accidents.

Of all of the car accidents in 1986, 10.9 percent were caused by a driver failing to yield the right of way; 8 percent were caused by speeding; drivers who lost control of their vehicles were involved in 6.8 percent of the accidents; and tailgaters caused 5.7 percent of that year's collisions.

Statistics on fatalities on the road reveal that speeding is the number one driver error that can result in death (16.3 percent). Another 8.1 percent of the deaths on the road occurred due to the failure to yield.

Although there is little variation in the total number of accidents that occur seasonally, there are certain types of accidents that are more frequent in winter than in summer and vice versa. During the months of October to March (roughly the snowfall season) there are fewer fatalities on the road, but the percentage of accidents that cause property damage, without personal injury, rises to its highest point. In the summer months, of course, there are more people on the highways going to and from cottages and taking vacations. For this reason almost 60 percent of the traffic fatalities in 1986 occurred between April and September.

The statistics quoted in this article have only summarized some of the major findings of the *Ontario Road Safety Annual Report*. If you would like to receive a free copy of this publication, please write to:

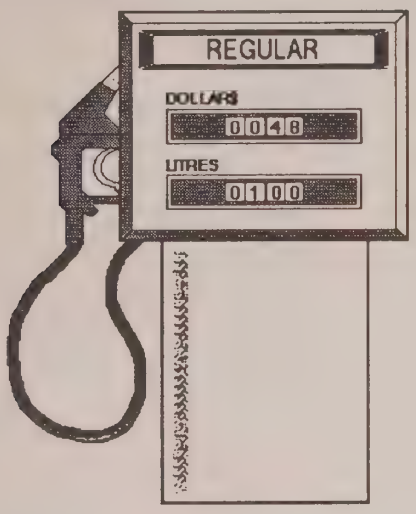
The Ministry of Transportation
Transportation Regulation
Development Branch
Safety Co-ordination and
Development Office
West Building
1201 Wilson Avenue
Downsview, Ontario, M3M 1J8

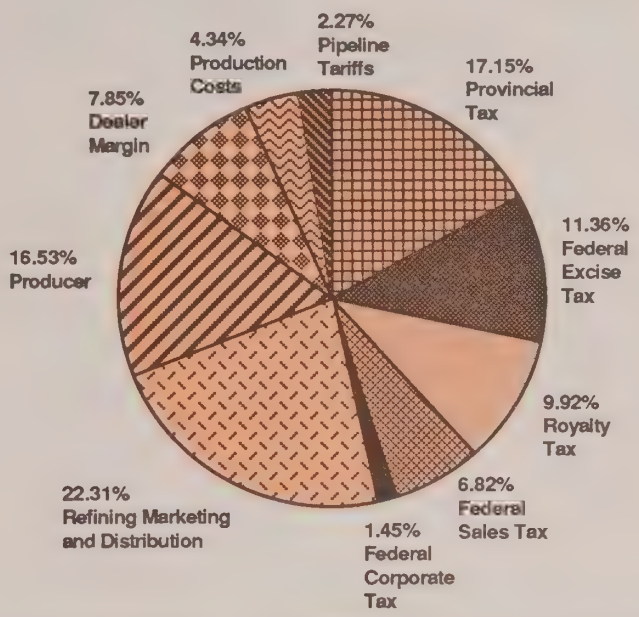
Where Your Gasoline Dollar Goes

According to statistics gathered by the Petroleum Resources Communication Foundation for the first week of September, 1987, domestic regular leaded gasoline was going for 48.4¢ per litre in Ontario. The following chart shows where the money you spend at the gas pump finally ends up.

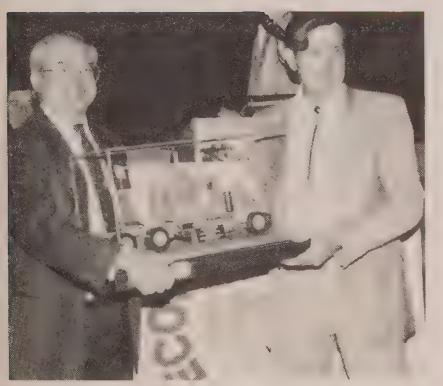
It should be noted that the price of crude oil fluctuates on a daily basis since Canada deregulated the pricing of crude oil in 1985. This chart is only valid as a snapshot estimate of the distribution of the price of gasoline calculated at a specific point in time – the week of September 1, 1987.

Data from the Petroleum Resources Communication Foundation





The 1987 Economy Challenge Results



Lloyd Secord (right) receives first prize from Gerry Johnston, Assistant Deputy Minister, Provincial/ Municipal Transportation

This year's Economy Challenge, the annual trucking event sponsored by Trucksave, drew a spectacular line-up of professionals.

The Economy Challenge is a government and industry sponsored event designed to make participants more aware of fuel-efficient trucking and the driving techniques that can help achieve it.

The winners of the 1987 Economy Challenge were Lloyd Secord of Peter Hodge Equipment and John Tillaart of J.E. Thompson. Secord won the overall stock class achieving a fuel rating of 29.73 L/100 km (9.5 mpg), grossing at 52 450 kg. Tillaart won the overall owner/operator class with a fuel rating of 30.67 L/100 km (9.21 mpg), grossing at 49 570 kg. Both men drove 1985 Mack tractors with 350 hp Mack engines.

A new competition and a new route were added to this year's Challenge. The new Interprovincial Challenge was run between Winnipeg and Kenora in conjunction with Pro-Trucker of Manitoba. And the new route, Bainesville to Joyceville, was added to the original Chatham/ Milton and Bowmanville/Joyceville routes.

The Interprovincial Challenge was won by John Grant of Kleysen Transport. He achieved 25.2 L/100 km (11.2 mpg), driving a 1988 Kenworth tractor with a 285 hp Cummins engine. His GVW was 49 740 kg.

Congratulations to all the drivers and companies who participated in the 1987 Challenge.

For a complete list of winners and results, contact Trucksave at (416) 235-5037, or write to:
Trucksave
Room 324, Central Building
1201 Wilson Avenue
Downsview, Ontario
M3M 1J8

ECONOMY CHALLENGE 1987

Pavement *continued from page 1*

measure pavement condition by bouncing a beam of light off the surface of the pavement. The reflected beam hits a light-sensitive displacement sensor which records the point of contact and its intensity, thus indicating the state of the pavement at a particular point. Seven of the lasers sample at a rate of 16,000 readings per second; the other four sample at 32,000. The high frequency of the laser means that the RST van can drive at speeds ranging from 15 km/h to 90 km/h without compromising its .2 mm accuracy or the reliability of the sampling.

Several aspects of pavement condition are analyzed by the RST. The degree of roughness of the pavement is recorded and converted into a number representing its International Roughness Index (IRI) which can range from one (the smoothest ride) to nine (the roughest). Any stretch of pavement with an IRI of 6.5 or over will cause a driver to alter his or her behaviour on the road. Rut depth, referring to troughs that develop along the wheel paths of the roads, can also be determined, along with cracks (the number and their depth) and macrotexture (whether the surface is crumbling or smooth).

Further Facets of the RST System

All of this information is fed into a Hewlett Packard computer in the back of the van where the millions of pieces of data generated by the laser analysis are averaged every 100 metres or so. Along with this data from the laser analysis, the computer accepts subjective data from the crew in the van. This includes such visible characteristics as heavy crack sealing, longitudinal cracking (since cracks that run the length of the road are difficult for the RST to identify), and environmental data such as the presence of curbs, gutters or guard rails. All of this information is then rendered easily accessible for the client via any of the eight software modules that organize pavement management data.

The RST is a self-contained unit mounted on the front of a regular-sized van

The software provides municipalities with clear, concise information ranging from the status and causes of current pavement conditions to recommendations for five years of rehabilitation. Clients are given a printout of the results obtained by the software, tailored to their specific needs. The software can also be purchased by clients for use on IBM or compatible personal computers.

The pavement management service provided by IMS doesn't end there, however. To obtain a firm background upon which to base a rehabilitation strategy, municipal records of the traffic volume and environmental conditions are also considered. As well, to determine the "deflection basin," or resilience, of the pavement IMS operators use a Dynaflect machine. If IMS discovers that certain areas of a road need major rehabilitation, they will drill into the road and take core samples to determine the physical structure beneath the pavement.

The Laser RST is constantly being modified and improved, which makes it impractical for a municipality to purchase the machine. However, the RST and the accompanying services need only be rented once every five years to keep pavement in good condition.

The Future of Pavement Management

One of the next developments in store for pavement management is continuous deflection readings. The Dynaflect machine would no longer have to stop every minute to sample pavement deflection; it would be integrated into the RST van. As well, the RST will eventually be able to plot cracking patterns, or alligatoring, and give three dimensional co-ordinates of where cracks and other stresses have occurred. In addition to this, IMS is currently working on an effective method of video logging for the purpose of recording the surrounding environment to provide further verification of pavement condition for the client.

If you'd like to receive this newsletter, or know someone who would, please fill out this form and mail it to:

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Ed Fulton
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Vol. 7 No. 1

Daytime Driving Lights:
The Pros Outweigh the Cons

The statistical evidence pointing to the effectiveness of daytime driving lights (DDL) as an accident-prevention measure is overwhelmingly convincing.

Two important findings of Transport Canada's research, for example, are that on-coming vehicles with headlights on are detected sooner and at greater distances; and that drivers judge vehicles with DDL to be closer than vehicles without DDL and, therefore, make fewer passing attempts in tight situations.

A simple way to confirm these statements is to observe how much easier a vehicle is to detect in your rear-view mirror if the driver behind you has turned on his/her headlights.

Many companies and organizations recognize the value of DDL and require or encourage their fleet drivers to drive with headlights on at all times. And many individual drivers are making use of daytime driving lights to make their vehicles more easily detected by other drivers, pedestrians, and cyclists.

The accident group that can be affected by DDL is estimated to be approximately one-third of the 187,000 accidents reported to police each year in Ontario. They are daytime accidents that involve multiple traffic units – motor vehicles, motorcycles, bicycles, and pedestrians. Most of this group is comprised of head-on, approaching, and angle collisions. DDL may also be effective against some rear-end and sideswipe (same direction) collisions where rear-view mirrors permit defensive action.

In Finland, where it has been compulsory to use low beam headlights outside of built-up areas during the winter months since 1972, multiple accidents in daylight dropped 27 percent over a four-year study period.

The DDL on the truck in the foreground increase its visibility, even in sunlight

Fear of Increased Operating Costs

In spite of the mounting evidence that DDL are an effective safety measure, they are neither routinely nor consistently being used on Ontario's roads.

The reason is probably that drivers are afraid of increased operating costs through greater fuel consumption, and more frequent headlight and other bulb replacements. Also, there is the possiblility of becoming stranded with a drained battery after parking and inadvertently leaving the lights on. These are understandable concerns. But once convinced of the safety advantages of DDL, fleet operators and individual drivers have several options for implementing them, and can choose the most economical and workable system for their situation.

When compared to the medical, social, and human costs of traffic accidents that could be prevented by the increased visibility provided by DDL, the costs are considerably diminished in importance.

Several Options

One way to implement a DDL policy is to simply turn on your headlights at the start of every trip. But the cost of running all lights in daytime is quite high, as shown in the table on page 3. To overcome the problem of dead batteries caused by forgetting to turn off your headlights, you could install a headlamps-on reminder buzzer or chime. This is standard equipment on many models, and is available as an option on most cars and trucks.

An alternative is to add a relay, which is controlled by the ignition, to

Continued on Page 3

Performance Report: Natural Gas for Vehicles

Natural gas for vehicles (NGV) has been in use for many years, but is just now gaining in popularity in Ontario. NGV has a number of advantages over gasoline and diesel. Firstly, it is a clean burning fuel, particularly in comparison with diesel, which produces a black soot. It burns cleaner in the engine, which reduces wear, and exhaust emissions in general are lower.

Cost is a major advantage: NGV is about half the cost of gasoline and two-thirds the cost of diesel. This is partially due to the waiving of road tax by the province. In addition, the province will provide a provincial sales tax rebate on the price of a vehicle and conversion equipment to a maximum of $1000. The gas utilities in Ontario provide various amounts of conversion assistance and the federal government provides $500 grants. Hence, NGV is financially attractive.

NGV fuel storage is a drawback. The tanks are large and occupy storage space in trucks or truck beds. Since the fuel is stored as a compressed gas, the volume in a tank is limited and, therefore, the vehicle range on a fill is less with NGV than with gasoline. The cost of fuelling stations is high and, as a result, they are not popping up on every street corner, the way gasoline stations have. When fuel is available near municipal yards, many municipal vehicles become ideal candidates for conversion, since these vehicles usually have a relatively fixed duty cycle and a limited range that is compatible with the reduced range of the fuel.

At present, most NGV retail stations are located in the southern part of the province in the larger urban areas. This network is growing rapidly and the number of converted vehicles is growing along with it. Also, more and more municipalities are showing serious interest in the fuel. In several locations where fuel is not available, private fuelling facilities have been installed to service municipal vehicles.

Currently, it is not possible to purchase an engine specifically designed for natural gas. All natural gas engines in use have been converted from gasoline or diesel. Gasoline engines can be easily converted for NGV use with the addition of an NGV fuelling system and with a few modifications to the existing ignition system and/or engine computer. Diesel engines must be converted to spark ignition in order to operate on NGV.

Anne Tesluk of the Trucksave Program and the first MTO natural gas powered truck, which has been in service since 1981

Due to the range reduction and the absence of a refuelling station on every corner, most natural gas vehicles are dual fuel; they operate on either natural gas or, in areas of limited availability, on gasoline.

Who Uses Natural Gas?

There are a number of NGV projects within municipalities that are being closely monitored by other municipalities considering using NGV.

- Elgin County School Board was the pioneer in NGV use in school buses and currently has 37 buses in NGV operation and has installed a slow-fill and fast-fill station in their yard.
- In the City of Etobicoke Public Works Department, after an initial evaluation, public works vehicles were converted and a fast-fill 55-cfm compressor was installed. The vehicles range in size from pickups to 10,000-lb GVW trucks.
- The City of Chatham Works Department has seven utility trucks operating on NGV and will be converting police vehicles soon.
- Twenty vans at Essex Hydro are operating on NGV for evaluation purposes.
- The City of Kitchener is converting one car and four utility vans to NGV and is considering bus applications.
- The Ontario government has converted 45 vehicles, mostly pickups, to operate on NGV.

Transit Application

This application is the most interesting and promising. Transit properties are looking for alternatives to diesel that are cheaper and cleaner. One factor that is causing many transit operators to look at NGV is the proposed emission standards for diesels that require that particulates be removed from emissions. The technology for this is not developed and research to date suggests it will be very costly, making alternative fuels quite attractive.

Since November 1985, Hamilton Street Railway has had six standard 40-foot GM transit buses in service. The buses have four-stroke diesel engines converted to spark ignition and dedicated to natural gas. Each bus saves $4000 to $5000 per year in fuel costs. Bus performance has been more than satisfactory; plenty of power, low emissions, and reduced noise and vibration. Six additional buses will be converted this year.

In Toronto, the Toronto Transit Commission (TTC) recently announced that it will evaluate NGV buses as possible replacements for its costly trolley buses that are due for

Continued on page 3

Daytime Lights *continued from page 1*

the output circuit from the headlight switch. This allows the parking and headlights to be controlled by the driver in the normal fashion, but automatically shuts off the headlights when the ignition switch is in the "off" position. The cost of this is under $10. But the expense of running all lights remains.

Automatic DDL Systems

Rather than simply switching on the headlights at the start of every trip, an automatic switching system or an add-on driving light system is a more economical way of implementing a DDL policy. Canadian-made kits are available that will automatically illuminate only two lamps at reduced voltage, which will minimize any possible extra wear on the alternator and battery.

In 1977, Sweden legislated all vehicles to use low beam headlights or special running lights 24 hours a day, every day of the year, in all parts of the country. Within one year, multiple vehicle daylight accidents decreased during the winter months by 20 percent in urban areas and by 17 percent in rural areas.

Add-on Lights

DDL systems using add-on lights were developed in the 1970s when DDL regulations were introduced in Sweden and Finland. Similar kits are now available in Canada. They consist of a relay, wiring, and two lamps that can be installed below the bumper or in the grille area. Installing this kind of kit is electrically simpler than installing a system that uses existing lights as DDL, but locating the lamps where they are protected from impact can be a problem on some vehicles.

Lifetime Operating Costs per Vehicle of Daytime Driving Lights

System	Car	Light Truck	Heavy Truck	Bus
All existing lights	$350	$350	$560	$1130
Automatic DDL options:				
Reduced intensity high beams	$ 30	$ 40	$ 40	$ 70
Reduced intensity low beams	$130	$130	$190	$ 340
Higher intensity parking lamps	$ 70	$ 70	N/A	N/A
Turn signals	$ 60	$ 60	$ 90	$ 180
Add-on daytime driving lights	$ 60	$ 60	$ 90	$ 180

The costs shown in this table consist of extra fuel and bulb replacement. The extra fuel is used to produce extra electricity consumed by the DDL.

Masking

One serious disadvantage brought about by the current lack of uniformity in DDL use is the phenomenon of "masking." Vehicles without lights are masked by the surrounding vehicles that do use DDL. Until there are regulations that will ensure consistent use of daytime driving lights, the only way individual drivers can protect themselves against being masked by other drivers' DDL is to make the decision to use DDL.

Transport Canada conducted a study at Canadian military bases in 1975 in which half of 350 vehicles were modified so that the low beam headlights were automatically switched on whenever their engines were running. These vehicles had 22 percent fewer accidents than the other half, which did not operate with lights on in daytime.

Greyhound bus lines found that daylight collisions dropped by 24 percent in one year after they directed their entire fleet to continuously use their headlights.

An Idea Whose Time Has Come

No single safety measure will eliminate all types of road accidents. But DDL have been shown to be effective, simple, and inexpensive to implement. They benefit not only the occupants of DDL-equipped vehicles, but also occupants of other vehicles, pedestrians, and cyclists who can see the lit vehicle better.

Mandatory DDL is an idea that is being seriously considered by federal and provincial governments, and one whose time has come. Road safety affects everyone of us – drivers, passengers, pedestrians, and cyclists – and we all have a stake in implementing any proven safety measure.

NGV *continued from page 2*

retirement. As a first phase, the TTC will acquire and evaluate 25 buses fully dedicated to operate on NGV. The TTC hopes that these buses will be able to increase service, reduce cost, and provide a clean alternative to the trolleys.

For further information on these projects, or for a copy of booklets on any of the alternative fuels, please write to:

The Ministry of Transportation,
Transportation Energy Office,
Room 324, Central Building.,
1201 Wilson Avenue,
Downsview, Ontario,
M3M 1J8

Accident Report: Trends and Implications

The 1986 *Ontario Road Safety Annual Report's* traffic accident statistics reveal some eye-opening percentages. Although the number of fatalities on Ontario's roads is decreasing each year, the death toll for 1986 was still over 1,000. An analysis of the data reveals numerous revealing facts that can be used to help reduce traffic accidents. Surprisingly, poor lighting, visibility, and road surfaces cannot be deemed the primary causes of accidents; the majority of accidents occurred in ideal weather and environmental conditions.

Types of Impact

There is a fairly equal division between the three most common types of impact in non-fatal accidents: "rear-end" and "angle" collisions accounted for 23 percent and 22 percent respectively and "single motor vehicle" accidents were the highest at 27 percent. Of fatal accidents, a tremendous portion, 49.6 percent, were single vehicle accidents.

Analyses of types of initial impact support the notion that factors such as weather, road conditions, etc. play a secondary role in causing accidents.

The Time Factor

Leisure activities seem to increase the frequency of accidents. Eighteen percent of accidents occurred on Fridays between the hours of twelve noon and six p.m. This is considerably higher than any other six-hour period in the week.

An astounding 55.2 percent of fatal accidents occurred on weekends (Friday to Sunday). The larger number of automobiles travelling on these days could be the cause; or drinking and driving could possibly contribute to the large number of accident-related deaths on the weekends. Whatever the cause, these statistics should warn drivers that extra caution is needed on weekends.

Selected Statistics

Total Reportable Accidents	187,286
Fatal Accidents	951
Personal Injury Accidents	73,703
Property Damage Accidents	112,632
Persons Killed	1,102
Drivers Killed	610
Drivers Killed (Impared or had been drinking)	286
Passengers Killed	304
Pedestrians Killed	153
Other Road Users Killed	35
Persons Injured	108,839
Estimated Ontario Population(1986)	9,181,900
Licensed Drivers	5,817,799
Registered Vehicles	5,421,220

Lighting Condition and Visibility

There is a marked difference in the number of accidents occurring in daylight and night-time: 66.4 percent occur in daylight. Also, 76.2 percent of all accidents occur when visibility is good. Research shows that the percentage of day-light accidents could be reduced through the use of daytime driving lights (see the article on daytime driving lights in this issue).

Location on the Road and Road Surface

Sixty-one percent of all accidents in 1986 occurred at intersections. Fifty-eight percent of all accidents occurred on dry roads; 25.7 percent on wet roads; and 15.8 percent on snow, ice, slush, or loose gravel-covered roads.

The 1986 annual report shows a surprising tendency of accidents to occur in daylight, on dry surfaces, at or near intersections and supports the notion that rather than external conditions, often the cause of an accident is human error on the part of the driver. Most drivers increase their defensive driving techniques on wet, icy, or snow-covered roads, and in situations that require concentration such as crossing multiple lanes of traffic at an intersection, passing, or entering the flow of traffic. But it seems to be unguarded moments, perhaps when we are mentally preoccupied or impatient to get somewhere, when we are most vulnerable.

If you'd like to receive this newsletter, or know someone who would, please fill out this form and mail it to:

Frank Cherutti
Executive Secretary
MTEAC
3rd Floor, Central Building
1201 Wilson Ave.
Downsview, Ont.
M3M 1J8
(416) 235-5030

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MTEAC NEWS

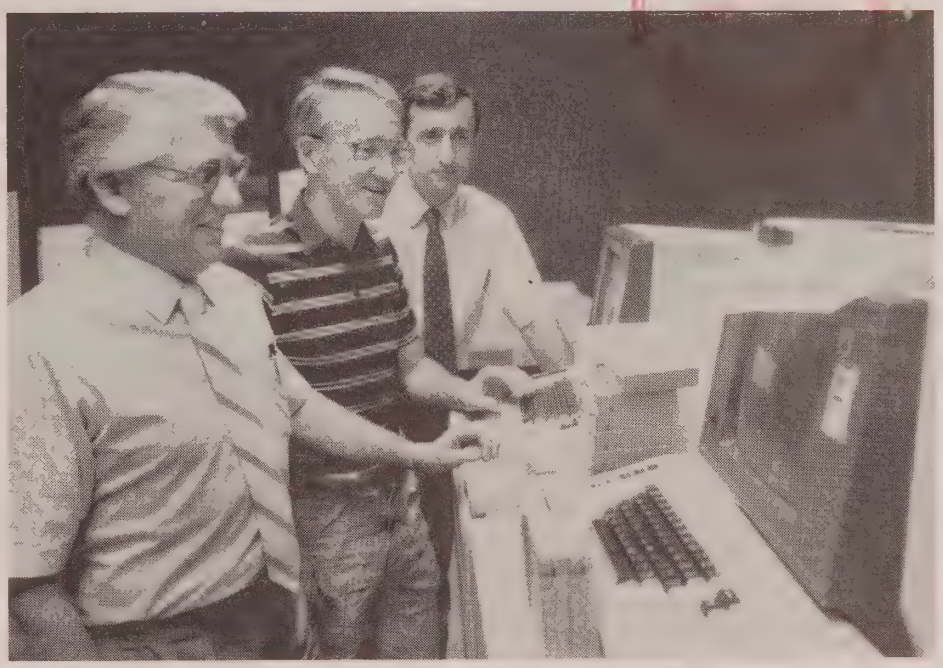
Summer 1988

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES AND THE PROVINCE OF ONTARIO

Vol. 7 No. 2

A Practical Approach to Pavement Management from an Academic Beginning

This is the fourth installment in a series of articles about pavement management systems available in Ontario. Previously, MTEAC presented the MUNIPARS system (Spring 1987), the ARAN (Summer 1987), and the IMS system (Winter 1988). Here, we profile a Canadian company, Pavement Management Systems Limited (PMSL).



Pavement Management Systems Ltd. balances sophisticated technology with human input to provide a complete range of service to its clients. Shown here are, left to right, Karl Link, marketing manager, Dr. Ralph Haas, chairman of the board, and Dr. Matt Karan, president.

Pavement Management Systems Limited, a Cambridge-based company, has been the subject of media attention lately. The Canadian company recently outbid several U.S. engineering firms to win a $5.3-million contract with the United States government to help conduct a massive highway research study. Over the next five years, the company will collect data on the condition of roads at hundreds of points in 15 states and six provinces in the North Atlantic region. Roads expert, Bill Phang, working with PMSL on a leave of absence from MTO, will manage this study. This project will be described in-depth in a future issue of *MTEAC News*.

The $5.3-million contract is part of a larger program, called the Strategic Highway Research Program (SHRP), which has been granted $150 million by the U.S. government, under the 1987 Highway Act, to improve North America's road system. All the Canadian provinces have agreed to co-operate in this U.S.-sponsored project.

The History of the Company

In the early seventies, the president of PMSL, Dr. Matt Karan, was a graduate student in civil engineering at the University of Waterloo. At that time, pavement management was only beginning to be seen as the pressing issue in North America that it is today. To Karan and a few others, it was becoming apparent that a more systematic and professional method of gathering and interpreting road analysis data was needed. This inspired Karan to devote his graduate studies to con-

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ceptualizing a procedure for interpreting road data. Thus Karan, Dr. Frank Meyer (a fellow student who is currently the vice-president of the company), and their supervising professor, Dr. Ralph Haas (currently the chairman), set out to create a management and engineering system designed to assist in the process of pavement management.

The research conducted by Karan and Meyer over the course of their graduate studies included a collaboration with MTO in 1974. In that project, radar was used to measure the effect of road roughness on vehicle speeds. The conclusions of the study were presented to the Transportation Research Board and were very well received. Karan also conducted a study to determine the costs to drivers that result when roads are closed or partially blocked due to construction.

This research culminated in the creation of a computer program that could accept and evaluate surface condition data. It was the prototype of one of the many programs that PMSL now uses.

The program was first tested, with some help from MTO, on roads in Waterloo and Cambridge. The advantages of the system impressed Waterloo municipal officials and, when they expressed an interest in retaining this service, Karan and the others recognized the potential for a successful business.

Initially, the idea of professional, computer-assisted pavement management seemed infeasible to most of the municipalities that were approached with this new system. PMSL had to convince them that this approach would be much more efficient and economical in the long run and, eventually, municipalities all over North America began to see the advantages of pavement management and PMSL's services and products.

In 1983, with a staff of 15 people, the company moved its home office to Cambridge to serve its Canadian clients. Now it is the largest company devoted solely to pavement management in North America. It has a staff of 60, including five people with PhDs and several civil engineers with masters degrees, and has offices in Buffalo, Denver, Los Angeles, Vancouver, Calgary, and Edmonton.

The Pavement Management Service

One of the main selling points that the company stresses is its abundance of experience and expertise in the pavement management field; it balances sophisticated technology with human input. In Matt Karan's words, "there is still no fully automated approach to pavement management." So the company employs human judgement for the aspects of pavement evaluation that the technology cannot recognize.

PMSL uses vans instrumented with units called RT-1000s to measure the roughness and surface condition of the pavement. The RT-1000 ("RT" stands for "road tester") is a computerized, self-calibrating unit. As the vehicle drives over the pavement, an accelerometer measures the vertical movement of the axle, which is then translated into workable data by the onboard computer. The numbers generated by this process represent the roughness of the pavement. This method has proven to be highly reliable and consistent when driving at highway and city speeds.

Each of the company's vans is equipped with two computer keyboards for inputting road condition data. As the RT-1000 takes readings from the road, the operators inside the van record relevant data on the type of road distress, its density, and severity.

PMSL also establishes the ridability of pavement sections in human terms by using a panel of resi-

The RT-1000 is a self-calibrating unit installed in a van.

dents to drive on a representative set of roads and rate them according to ride comfort. This rating is then correlated with the measure of roughness established by the RT-1000.

Another feature of PMSL's system is the adaptability of its components and products. There are six user-friendly software packages available to PMSL clients, each varying in its degree of customization and complexity. They begin with Series 10, which is a straightforward database program. It is the simplest and the least expensive of the six packages, which suits it to the needs of the smaller municipalities. Series 20 is similar, but it has the advantage of being able to forecast pavement deterioration and aid in the planning of repairs. The software programs from Series 30 to Series 60 are designed for larger municipalities and highway agencies. They are also more adaptable, Series 60 being a software package that is completely tailored to the client's needs. As well, each series of software available from PMSL can be designed to run on whatever computer hardware the municipality already owns.

The client always has options when deciding how much they will require. For example, small municipalities need not buy any software at all. PMSL can perform a pavement analysis and then submit a report

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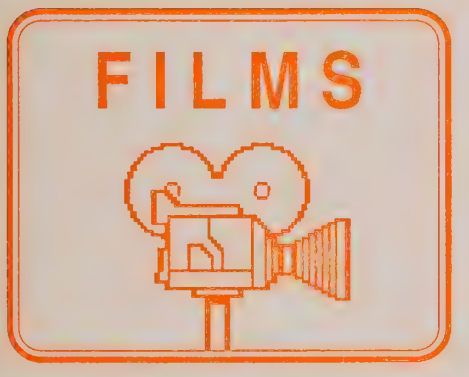
containing a five-year rehabilitation plan that will either conform to a given budget, or inform the municipality how much they must spend to maintain acceptable pavement conditions. However, if a client prefers to be more independent, the company can provide a municipality with customized software that will accept any road data that the client has already collected. The equipment, the RT-1000, and the Dynaflect (which tests pavement resiliency) are also available for rent, including the training to use it, if the client wishes complete independence.

Pavement Management in the Years to Come

Matt Karan predicts that one of the next major innovations in pavement management will be computerized image analysis. This is the process of taking pictures of the road from a moving van, then having them digitized so that a computer can scan them for indications of cracking and other distresses. This technology has been researched by MTO and the University of Waterloo, and is currently being developed and tested by several agencies. PMSL plans to put its new RT-1500 into service soon and an even more advanced unit, the RT-2000, is in the development stage.

End



As the number of drivers on our roads continues to increase, safety and safe driving techniques become more and more important. Here, we have compiled a list of films available to municipalities, free of charge, concerning transportation and various safety measures. They can be obtained from:

Ministry of Transportation
Audio Visual Services Section
Public and Safety Information Branch
1st Floor, West Tower
1201 Wilson Avenue
Downsview, Ontario
M3M 1J8
(416) 235-3902

Please book films at least two weeks prior to showing date.

Planning Smarter Driving Smoother
(16 mm and video)
Date: January 1984
Length: 28 minutes
– Driving techniques and habits for fuel-efficiency. Designed for operators, maintence crews, and fleet operators.

Trucksave "Less Fuel – More Profit"
(16 mm only)
Date: July, 1981
Length: 12.5 minutes
– Various methods of making large vehicles more fuel-efficient.

The Trucksave Edge
(16 mm and video)
Date: January, 1983
Length: 22 minutes
– How to make $12 000/yr extra profit using driving techniques specifically for tractors.

The Drive$ave Zone
(16 mm and video)
Date: January, 1983
Length: 23 minutes
– A lighthearted approach to energy efficient driving techniques and car care.

Easy Goin'
(1/2" VHS only)
Date: September, 1986
Length: 16 minutes
– Fuel saving driving techniques.

Living With Trucks
(video only)
Date: February, 1988
Length: 8.5 minutes
– Do's and Don'ts for car drivers sharing the road with large trucks.

The Human Collision
(16 mm and video)
Date: January, 1976
Length: 30 minutes
– Examination of forces at work in automobile collisions and how seatbelts work to prevent injuries.

Citizen Seatbelt
(16 mm only)
Date: April, 1976
Length: 15 minutes
– Animated cartoon dealing with seatbelt safety.

Sam the Safety Duck (Bicycle Safety)
(16 mm only)
Date: May, 1976
Length: 15 minutes
– Thirteen bike rules.

Sam the Safety Duck (On the Buses)
(16 mm only)
Date: January, 1977
Length: 15 minutes
– School bus safety.

Trilogy – Three for the Road:
(16 mm and video)
Date: July, 1980

Length: 22 minutes
Presents driving as an exciting but demanding skill.

– That Alcohol You
Length: 24 minutes
Humorous portrayal of the effects of alcohol on your body and personality.

– No Thanks, I'm Driving
Length: 16 minutes
The drinking and driving issue is tackled head-on.

On June 9th and 10th, 1988, the Association of Ontario Road Superintendants hosted its 3rd annual trade show. Pictured here is Ed Fulton, Minister of Transportation, (centre) officially opening the ceremonies. This year the event took place at the Niagara Falls Skylon Convention Centre and drew 2000 visitors from across the province. A total of 180 companies involved in equipment, supplies, and services related to municipal roads were represented. All in all, a success! Congratulations to those who made it all possible.

FOR YOUR INFORMATION

At the Ontario Good Roads Association convention in February, Transportation Energy and Productivity Program (TEPP) representatives received several requests for information on streetlighting and unwarranted stop signs.

In the early 1980s, municipal politicians were overwhelmed with neighbourhood pressure to install stop signs in residential areas. Excessive use of stop signs as a traffic control device to decrease the traffic flow in neighbourhoods can lead to disregard for stop signs, a false sense of security for pedestrians, an increase in fuel consumption, and an excess of noise and air pollution. These side effects are becoming more noticeable and now public opinion is changing – there is a movement to have unwarranted stop signs removed. Municipalities that want information on unwarranted stop signs can request copies of *MTEAC News*, Volume 3, Number 2 (July, 1984).

Streetlighting is another area of municipal interest. Municipalities want to know which type of lighting is the most energy- and cost-efficient. *MTEAC News*, Volume 4, Number 1 (March, 1985) contains a two-page article, entitled "Streetlighting: Sodium Luminaires Outshine the Rest."

To request information on streetlighting or stop signs, phone Mr. Frank Cherutti at (416) 235-5030 or write to TEPP at the MTEAC address.

The MTEAC newsletter is a publication of the Ministry of Transportation Energy Office

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Executive Secretary
MTEAC
3rd Floor, Central Building
1201 Wilson Avenue
Downsview, Ontario
M3M 1J8
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MTEAC NEWS

Fall 1988

MUNICIPAL TRANSPORTATION ENERGY ADVISORY COMMITTEE
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Vol. 7 No. 3

Value Management: A Technique to Reduce Costs and Improve Value

On June 22,1988, Bob Charette of Hanscomb Consultants Inc. made a presentation on value management to MTEAC. The committee felt that the subject of the presentation would be of interest to MTEAC News *readers.*

By Robert P. Charette, P. Eng.

Today, the financial demands on municipalities are increasing more rapidly than the revenues. To meet this challenge, management must have the tools necessary to maximize value for funds expended. One of these is a technique called value management (VM), also referred to as value engineering or value analysis.

Pictured above at the value management workshop session for Pratt & Whitney's plant expansion project in Mississauga are from left to right: Bob Charette, VM team co-ordinator, Peter Mason, Hanscomb principal and project manager, and Ron Perry, architect with Norr/SH&G.

Its objective is to increase value by either retaining the same "functions" and reducing costs without sacrificing performance and quality, or to provide additional functions at the same cost.

Value management was first applied during the Second World War when many of the materials and sub-assemblies required in the manufacture of defence products were not always available to meet the heightened demand. The purchasing department at General Electric then issued specifications that described the "function" or "performance" expected of the products instead of the material or assembly to be purchased. Surprisingly, entirely suitable materials were proposed not only at a lower cost, but with a superior performance over the original product.

A few years after the war, value management procedures were formalized by Larry Miles of General Electric and, in time, were extended to manufacturing, construction, administration, and industrial design throughout the world. In some U.S. government agencies, value management on construction projects is manadatory by law for all projects over a specified amount. Perhaps not surprisingly, although Americans developed the methodology, the Japanese today are considered not only the experts, but also the major users of this process.

In Canada, a number of government departments and crown corporations have been involved in VM training sessions and VM workshops; these include Public Works Canada, Alberta Public Works, British Columbia Building Corp., Correctional Services Canada, the Ottawa-Carleton Transport Commission, and the Quebec environment ministry.

Continued on Page 3

Handle With Care

This article discusses the investigations of the Toronto Area Rail Transportation of Dangerous Goods Task Force and draws inferences for the shipping of dangerous goods by truck.

The transportation of goods across this vast country has always been a key factor in our economic development. Among these goods, however, we find chemicals, gases, flammables, and poisonous substances that collectively are known as dangerous goods.

On November 10, 1979, an accident occurred that pushed the issue of dangerous goods transportation into the spotlight. A freight train 106 cars long, 38 of which were carrying dangerous materials, derailed at Mavis Road in Mississauga. A ruptured chlorine tank car and burning propane led authorities to evacuate 240,000 residents for nearly one week. Although the accident in Mississauga was handled very efficiently, it clearly illuminated the need for public protection.

Dangerous goods are ever-present around us. They ride the railways near our homes. They travel alongside us on the highway to the cottage. They even follow us through the streets of our towns and cities. Yet, how many of us are aware of these potential hazards? When you pass a tractor-trailer on the highway, do you consider what materials it may be carrying? Do you wonder if the driver is properly trained to handle an emergency that may occur before he reaches his destination? Where is his destination? And why has *this* particular route been chosen?

In Ontario, dangerous goods are shipped primarily by road and rail. In March of 1986, the Toronto Area Rail Transportation of Dangerous Goods Task Force was created to investigate the movement of dangerous goods on the railway system. Its focus is on public awareness, the feasibility of rerouting on existing and new track, and the improvement of safety practices by railways and regulating bodies.

As part of its investigation, the task force conducted a public perception survey to determine the level of concern regarding the risk of dangerous goods rail transportation. Generally, it seems that the public is willing to accept our existing railway system, but it wants to see a significant effort on the part of government and industry to eliminate risks; namely, better training of personnel and reliable emergency response methods.

Photo: Larry Miller

Emergency response teams must be trained and ready and the public must be aware of response programs and know how to react should disaster strike.

Regarding rerouting, the task force is expected to make a recommendation in its final report. Six alternatives, making use of both new and existing track, were explored in light of degree of risk, capital and operating costs, and environmental and community impacts.

Should restrictions on rail transportation significantly increase, the use of trucks may increase. There are advantages and disadvantages to this. Transportation by truck appears to be more flexible around production, shipping schedules, and routes. This flexibility, however, means that at any given time, dangerous goods can be en route. Comparatively, when goods are shipped by train, we are more able to identify the time of shipment. Also, we know the rail routes and, consequently, the area that would be exposed to risk.

A topic raised during the task force's investigation was that of designating specific routes for dangerous goods carriers. With such designations, risk areas could be more easily identified and monitored. But this also creates problems. If a transport company is forced to use an indirect designated route, or is subject to other restrictions, it may become less profitable. Companies may abandon the shipment of dangerous goods entirely or raise their transportation costs. That would affect all of us: households use a great many dangerous goods or derivatives such as chloride, propane, ammonia, to name a few. One has to consider too, the immense task of enforcing a law regarding designated routes.

Whatever the method chosen, dangerous goods must be handled with care.

Continued from Page 1

One of the most active groups is the Quebec environment ministry, which has been successfully applying this technique to pumping stations and wastewater plants for about two years; as a result, it is presently negotiating one-year contracts for VM services with qualified firms for next year's construction program.

In the private sector, such firms as Pratt & Whitney, Xerox, Bell Canada, Imperial Oil, Canadian Arsenals, and Teron Construction have also applied VM successfully, and in all cases have exceeded the minimum anticipated return on investment (ROI) of 5:1.

Key Elements of Value Management

Formal value management procedures include the following key elements:

- A *structured methodology* referred to as the "Job Plan." Better results are obtained from a planned approach.
- A *multidisciplinary team effort* that cuts across interdepartmental lines. Everyone affected by the project, such as the occupants, maintenance staff, operators, etc., has the opportunity to be heard and form part of the decision-making process.
- *Creative techniques.* The principal one is formal, directed brainstorming; there are no sacred cows and any and all ideas are evaluated during such sessions.
- *Function analysis techniques.* These are utilized to the degree required to obtain an in-depth understanding of the project and related functional costs.

Any value engineering program that does not include these key elements is not truly in conformity with the methodology developed by Larry Miles in 1947 and accepted worldwide, as evidenced by the development of VM standards in several countries such as Germany and France.

The Value Management Job Plan

A basic VM job plan consists of five phases and a planning/orientation phase referred to as Phase 0. The activities carried out during each phase are as follows:

Phase 0 — Planning/Orientation
This phase covers pre-workshop tasks such as defining with the client the scope of the workshop and constraints, selecting team members, preparing the agenda, etc.

Phase 1 — Information/Function Analysis
All pertinent data are gathered on the project, including program requirements, budgets, schedules, estimates, energy budgets and studies, drawings, etc. This information is then formatted for easy and rapid assimilation by the design team members. The main objective is to understand program functional requirements (needs) to allow alternatives to be generated in the following phase based on valid information.

Function analysis techniques are employed during this phase to gain an in-depth understanding of the relationship of requirements (functions) and costs, ie., costs are allocated to functions performed. The identification of functions is at the heart of the VM process and provides total transparency as to what is being provided for funds expended.

Phase 2 — Speculation/Creativity
Alternatives are generated by the team during this phase. Anything and everything may be proposed or challenged including the program requirements, user needs, estimates, building code requirements, and possibly the need for the project itself.

Phase 3 — Analysis/Evaluation Phase
Ideas generated are discussed, with team members sharing their past experiences. They are then rated and ranked, with the better ones selected for the Development Phase.

The evaluation of ideas is not solely economic or quantitative; weighing factors is used to reflect the relative importance of aesthetics, durability, safety, service, availability, etc.

Phase 4 — Development/Investigation Phase
The more promising alternatives selected in the previous phase are then developed to the degree necessary to establish their feasibility, capital and life cycle costs, effect on others, implementation time, advantages and disadvantages, etc. Life cycle costs are particularly important to minimize future ongoing costs as much as possible within budgetary constraints.

Phase 5 — Presentation/Reporting Phase
The VM team usually presents the results orally to senior management at the end of the workshop. This is followed by a draft report with all back-up information, and a final report indicating which alternatives were selected for implementation by the decision makers.

The value management methodology is in practice flexible since there is some overlap between the phases as well as iterations. The process, however, remains consistent; to analyze and understand the problem at hand, develop a number of alternatives, analyze the better alternatives in depth, and formalize the results for the decision makers.

Workshops may take from one day to ten days depending on the complexity of the project. The Job Plan ensures that whatever time is spent on a project will be extremely cost effective, as evidenced by the usual high ROI anticipated.

VM teams should usually identify potential cost savings in the order of 10 to 25 percent of capital cost. The acceptance rate of savings proposed will usually vary from 25 to 50 percent, giving an overall potential net

Continued on Page 4

Continued from Page 3

saving of 2.5 to 12.5 percent. It is said that "to get a good idea you need a lot of ideas" and for this reason it is not expected that all ideas developed are necessarily acceptable: this is part of the VM philosophy.

In certain cases, cost increases may be proposed if solutions advanced do not meet client or program requirements; there is a significant benefit in identifying such discrepancies early to take corrective action while there is time, i.e., obtain additional funding, reduce the scope of the project, or devise new solutions to meet functional requirements at a reduced cost.

Application to Municipal Projects

The application of VM could be considered for major municipal projects, such as roads, bridges, garages, schools, hospitals, offices, recreational and cultural facilities, wastewater plants, pumping stations, etc.

Its implementation would complement and support project management by:

- providing an objective second look at the project;
- validating solutions proposed to meet requirements (user needs) or proposing alternative methods;
- accelerating the design process in the early stages of the project by furthering inter-disciplinary and inter-departmental cooperation and improving communications;
- reducing the costs of providing more for the same funds;
- reducing the element of risk related to cost, the scope of the project, and the ability to meet program requirements.

Implementation

Introducing a new program into any organization is not a simple matter even though there may be no doubt about the resulting benefits. In order to succeed, implementation must be carefully planned with the long term view in mind and must address anticipated obstacles. Here are some of the factors that ensure the success of such a program:

a) Management participation and commitment — not just moral support. Such programs must be driven by upper management, not lower level management.
b) A VM coordinator within an organization who is enthusiastic and committed to the task.
c) A commitment to training at all levels -- this could vary from one-hour executive briefing to SAVE (Society of American Value Engineers) approved 40-hour workshop training seminars. Short introductory seminars have proven very useful in orienting the thinking process of staff personnel toward obtaining more value in their day-to-day work.
d) A judicious selection of projects starting with suitable pilot projects prior to implementing a formal program.

As to a decision maker's risk involved in implementing VM manufacturing, industry statistics have established a 50 percent probability that a 28 percent saving will result and a 90 percent probability that a 12 percent saving will result. The savings may not be so dramatic in construction but they do favour the decision maker who opts for the application of VM.

VM Manual and Video

A 150-page EPA publication entitled "Value Engineering for Wastewater Treatment Works" is available free of charge; the techniques presented would apply to any type of construction project.

Also available is a 12-minute video prepared by Westinghouse entitled "The Criterion of Value"; it presents the results of VM programs implemented in the public and private sectors, including construction and transportation. This video may be purchased for $40 or borrowed from Hanscomb Consultants Inc. at no charge.

For more information, please contact:

Cecilia Paine
Hanscomb Consultants Inc.,
151 Eglinton Ave. West,
Toronto, Ontario,
M4R 1A6
(416) 487-3811

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MTEAC NEWS

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A Road Management Plan for Small Municipalities

About half of the 123 000 kilometres of road within Ontario's municipalities are contained in the smaller municipalities (towns, villages, and townships with about 100 kilometres of road). The condition of these roads is usually examined on an informal basis by a non-professional, then recommendations are made for rehabilitation. Although this method has been adequate for many years, there are considerable advantages to systemizing road evaluation and maintenance for small municipalities.

About three years ago, Bill Blum and Roy LeFevre, both of the Ministry of Transportation of Ontario, produced a manual consisting of pavement management guidelines, called *Road Management Plan for Small Lower Tier Municipalities: Methods and Inventory Manual.* A step-by-step guide to efficiently rating and rehabilitating roads in small municipalities, it helps to make pavement evaluation a more precise and systematic task.

The manual includes recommendations on how to conduct a study and how to create a five-year road management plan with the help of a consulting engineer. The cost of conducting such a study with the assistance of an engineer can be anywhere from $2,500 to $10,000 depending on the size and complexity of the task.

The Road Management Plan can help channel road maintenance funds where they're needed most.

There are many advantages to using this method. First of all, since the consulting engineer is an objective professional, this system is a more convincing and less political way to inform council of the rehabilitation needs of the roads. It is also more cost-efficient since the manual can help to channel funding where it is needed most.

The Road Management Plan also serves as a forecasting tool for determining the future adequacy of roads, and for developing a year-by-year work plan for maintaining them. This creates continuity in a municipality's approach to pavement management, and it eliminates the element of unpredictability in the task.

Every year, about $200 million is spent on road work in Ontario's small municipalities. The Road Management Plan will greatly help MTO in deciding which municipalities need extra funding above the base amount allotted.

Although the manual has only been available since May of 1987, there are already many small municipalities with studies underway, and the response has been positive.

The *Road Management Plan for Small Lower Tier Municipalities: Methods and Inventory Manual* can be obtained from any of MTO's District Municipal Offices throughout the province.

Canadian Expertise Contributes to Major U.S. Highway Research Project

During the last few years, it has become apparent that North America's roads are in need of maintenance. Last year, U.S. Congress recognized this neglect and approved a $150-million project called the Strategic Highway Research Program (SHRP, pronounced "sharp"). SHRP will last for five years and cover all of North America. The final product will be improved technology for pavements, bridges, and snow and ice control.

Nuclear density testing in a 4' x 6' test pit.

One of the areas of research within the program is Long Term Pavement Performance (LTPP). LTPP research will seek to develop better, longer-lasting pavements by examining road conditions with respect to a range of types of traffic, climates, materials, designs, subgrades, and ages. All of the research data will lead to an improved understanding of what will be required for future pavement design.

Since SHRP is such an extensive project, North America has been divided into four regions, with a different pavement firm directing research in each area. A Canadian company, Pavement Management Systems Limited, won the $5.3-million contract to carry out LTPP research in the North Atlantic region, which covers the eastern states and provinces including Ontario and Quebec.

Taking 4", 6", and 12" diameter cores.

The project manager of the North Atlantic program, roads expert William Phang, will work with Pavement Management Systems for the length of the study on a leave of absence from the Ontario Ministry of Transportation. It was Phang's reputation along with the expertise of Matt Karan (president of Pavement Management Systems) and Frank Meyer (vice-president) that helped the company win this major contract, despite stiff competition from American firms.

Pavement Management Systems will initially help to choose the sites that will best represent the road conditions, climate, materials used, and traffic volumes that are to be analyzed. When this is ac-

complished, data will be collected on a repetitive basis. These data include measurements of the structural soundness of roads with falling weight deflection equipment.

This new cooperation between Canada and the U.S. in the area of pavement research will be mutually beneficial. Pavements can remain in stable condition for anywhere from 15 to 25 years, then begin to break down at an accelerated rate. Many U.S. roads are at this latter stage now. If the LTPP researchers can discover and document the nature of this deterioration, the same problems can be avoided in the future. Thus, the LTPP program will establish a pavement management approach that will be applicable indefinitely. As Matt Karan described it: "This is a once-in-a-lifetime project." Canada's participation will also help to make the LTPP study more complete, since Canadian climate will be added to the gamut of conditions being studied.

Falling weight deflection testing.

In addition to being involved in the SHRP study, Pavememt Management Systems Limited has been awarded a major contract in the Canadian highway research study called C-SHRP. This smaller-scale version of SHRP will cover all ten provinces and will take into account the lower traffic volumes and colder Canadian environment. The study began in March 1988 and will last for four years. C-SHRP will monitor how municipalities have been conducting corrective maintenance over the years and judge how effective these methods have been. Upon completion, the end-product of C-SHRP will be a manual detailing the most effective approaches to correcting intrinsically Canadian pavement maintenance problems.

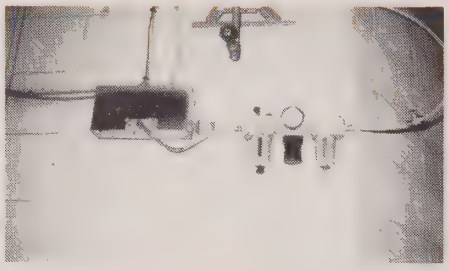
Both SHRP and C-SHRP are unprecedented studies. The results of these two projects are sure to be important advances that will have a positive impact on North American pavement management practices.

Bulk samples from a 12" auger.

New Garage Door Opener on the Market

In March 1988, MTO's Ottawa District garage had an air-operated garage door opener installed. Known by the trademark name, Airborne, it is an operator for overhead, slider, vertical lift, and bi-parting doors. The product seems to be performing well and is relatively trouble-free.

The manufacturer claims that the Airborne is three times faster than conventional openers – moving 24 to 30 inches per second, whereas electric doors move about 8 inches per second. This would speed up operations, especially for a large fleet – vehicles wouldn't have to queue up to leave and enter the garage. The greater operating speed would also reduce heat loss.



Air-powered door opener controls.

Owners require an air compressor that provides a clean, dry air supply of 75 p.s.i. and an air volume of .2 to .4 cubic feet. The operator can be used with doors that are 8 to 16 feet in height.

Anyone considering replacing a worn out door opener and interested in more information on this new product can contact:

Lavens Manaufacturing,
10 - 128 Manville Road,
Scarborough, Ontario
M1L 4J5
Telephone: (416) 755-3668

International Conference – VNIS '89
Vehicle Navigation and Information Systems

The IEEE Vehicular Technology Society is sponsoring an international conference on Vehicle Navigation and Information Systems (VNIS '89) to be held at the King Edward Hotel in Toronto, September 12 to 14, 1989. The conference is co-sponsored by the Ministry of Transportation of Ontario and Transport Canada. A major goal of the conference is to encourage interaction between the developers and potential users of this technology.

Papers are invited on vehicle navigation and information systems technology and applications.

Address correspondence to:

VNIS '89 Conference
c/o Insight Planners Inc.
133 Richmond St. W., Suite 502
Toronto, Ontario M5H 2L3
Tel: (416) 868-6565
Fax: (416) 868-0936

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A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES AND THE PROVINCE OF ONTARIO

Vol. 8 No. 1

Integrated Traffic Systems: The Road to the Future

"The transportation professional knows that a street and highway network is a very sensitive system, which must be constantly fine-tuned to keep it operating at peak efficiency" (Rothenberg, ITE National Conference, 1987).

This statement is becoming more and more relevant as cities grow and traffic volume increases. To see the importance of peak efficiency, one has only to look at the costs of inefficiency.

Fuel consumption increases as cars wait along poorly timed arterials. As fuel is wasted, the atmosphere is being poisoned with carbon monoxide and sulfur dioxide. Just as damaging are the effects on the driver. Safety is threatened as poor traffic flow leads to collisions. The trip to work becomes a battle to be fought every day. The enemy is unnecessary delay. The wounds of frustration and stress are carried into the office. And not the least of the victims is productivity.

How can efficiency be improved? There are basically two ways to improve traffic flow – build new roads or use existing ones more effectively. In the relatively few situations where road systems can be expanded to alleviate heavy congestion, development is slow and restricted by financial and environmental constraints.

A complementary method is to make more efficient use of the existing infrastructure. Looking specifically at traffic signal-related measures, there are several components to be considered:

- data collection/tabulation
- signal timing/capacity analysis
- traffic signal control

The limited functions and lack of versatility of the existing signal hardware and software inhibit the integration of the components. There are devices available for data collection and tabulation along arterials and at intersections but these devices have no other functions. There are highly developed systems for controlling signals at intersections, but none are capable of producing signal timing plans. The software that is available for analysis is usually single function, incompatible with other analysis packages, and must be purchased from a supplier. As all three components are required to complete the process of improving traffic flow, traffic analysts are obligated to spend much time and effort overcoming the lack of integration.

Recognizing this problem, the Ontario Ministry of Transportation and Transport Canada have initiated the development of an integrated traffic system (ITS). The goal of ITS is to link the components involved in the traffic engineering process into an integrated environment.

The ITS system is being designed to suit the needs of municipalities, especially medium-sized and small cities.

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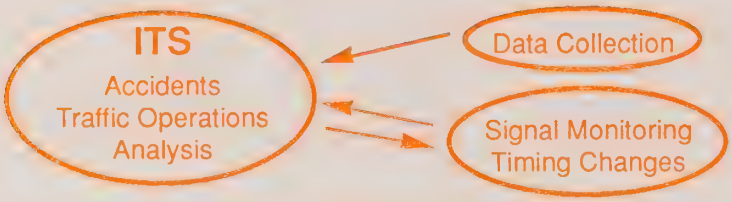

Integrated Environment

The key to the success of ITS hinges on its ability to provide flexibility. ITS is non-proprietary in nature and built with the dBase III relational databases and the Clipper compiler, allowing it to adapt to the varied needs of different jurisdictions and agencies as new programs are developed. ITS operates under the MS-DOS operating system on an IBM 286 or 386 terminal and an EGA colour monitor. The open architecture of the IBM system provides further flexibility for expansion and upgrading. The open design of the ITS software allows modules to be added and deleted as needs change. For example, a municipality could add a new analysis package or a new module as specific needs arise.

The two main types of data the ITS system accommodates are accident and traffic operations data. Accidents are entered in the same format as the new 1988 accident form. Traffic operations data include turning movement and 24-hour counts, road characteristics, and signal timing details.

At the centre of ITS is a network referencing system that provides the backbone for integration. All data related to accidents and traffic operations are referenced to a network created using a node-link system. Through this integration, ITS links programs and data elements so the output of one (e.g. 24-hour count) can be used as the input of another (e.g. PASSER II-84) with minimal manual intervention.

A prototype integrated traffic system is under development and is being implemented in three demonstration sites as the modules become available. The three sites are Metropolitan Toronto, Region of Durham, and the Regional Municipality of Ottawa-Carleton. The prototype system includes a data management system to handle accident data, traffic operation data, and network data. It also includes a component to provide linkages between the data and traffic analysis programs. The third component is an action item management module which will allow traffic engineering staff to track investigations, complaints, inquiries, or projects. The feedback from the sites has been positive and encouraging.

Following this initial development project, additional data management tools and analysis packages are expected to be incorporated into ITS. ITS will ultimately function as an umbrella linking the traffic engineering functions together with minimal operator intervention. Geographic information systems are also anticipated to further expand the functionality of the system.

As ITS is developed and users become familiar with its operation, savings and benefits will result. Traffic operations staff will have more time to review signal timing plans more frequently, which is essential for the proper operation of sensitive arterials and networks. The result of this is improvement in vehicular progression, which can offer energy reductions of 210 million litres of fuel in Canada annually.

Coupled with this fuel reduction is reduced carbon dioxide and sulfur dioxide emissions.

Improved traffic flow can also improve safety by reducing accidents on urban streets. The City of Ottawa estimated a 40 percent reduction in rear end collisions due to proper signal coordination. As well, the accident system within ITS would allow for identification of high accident areas. Problems could be identified and acted upon.

Finally, but of no less significance, is the driver's daily struggle with unnecessary delay. If this enemy can be eliminated, that is one less battle the driver has to face.

ITS alone will not solve all the problems in traffic engineering. But by utilizing the current power of computers to integrate the main components of traffic engineering, ITS will go a long way to converting a time consuming process into an effective method of providing efficient traffic operation.

For additional information, please contact Heather Creighton, Traffic Management and Engineering Office, Room 236, Central Building, 1201 Wilson Avenue, Downsview, Ontario. Tel: (416) 235-5281.

Estimated Energy Savings

Populations	10,000-50,000	50,000-100,000	100,000-350,000	350,000-1,000,000	1,000,000+	Total
No. of cities	108	15	15	6	3	
Annual Energy Consumption (millions of L)	59	127	343	912	2,610	
Potential Annual Savings/City Size (millions of Litres)						
More Frequent Timings	(.06%) .035	(.06%) .076	(.06%) .206	(.06%) .206	(.06%) 1.566	16
Improved Signal Timing	(.26%) .152	(.58%) .73	(.65%) 2.2	(.72%) 6.56	(1.34%) 34.9	194

MTEEAC

You have probably noticed that this newsletter has a new logo and the advisory committee has a new name: the Municipal Transportation Energy and Efficiency Committee. The new name reflects the advisory committee's objective of promoting efficiency in the use of transportation energy. This shift in emphasis is a result of the Ministry of Transportation program, TEMP's new focus on productivity in the use of Ontario's transportation energy resources.

The Transportation Energy Management Program (TEMP) was formed ten years ago in response to the oil crisis of the 1970s. The program's aim was to reduce Ontario transportation's vulnerability to possible oil shortages by reducing its dependence on oil, through oil conservation and by developing alternative transportation fuels.

Over the past ten years, TEMP, with its subprograms DriveSave, Trucksave, Municipal Energy (of which MTEEAC is a part), Government Fleetsave, and so on, has been successful in helping the transportation industry save an estimated 300 million litres of fuel, and displace another 2 billion litres by alternative fuels. During this period, however, the energy situation has stabilized – there seem to be no imminent oil shortages on the horizon – and it has become evident that TEMP measures can provide other benefits to the transportation industry besides fuel savings. In order to emphasize the greater opportunities and benefits offered by its measures and activities, the program has now adopted a new expanded objective: to increase the energy and operational efficiency and productivity of Ontario's transportation. It also has a new name, Transportation Energy and Productivity Program (TEPP).

This new objective, which opens up new directions and areas of activity, has not emerged overnight! Right from the beginning of TEMP, it was clear that the success of its initiatives and measures was not based on the amount of fuel they helped to conserve, but on the money they helped to save. In addition, fuel was not conserved by restricting its use, but by using it more efficiently, thereby increasing operational efficiency, which, in turn, resulted in increased productivity. The ultimate key to success is, therefore, increased productivity, which results in increased profits.

Clearly, energy efficiency is not the only way to increase productivity. Improved operational efficiency, increased safety, and awareness of changing transportation regulations will also contribute to overall efficiency, by reducing costs and damages caused by delays, accidents, and infractions of regulations. Hence, it is evident that the new objective is not a departure from the original program goals, but a restatement in terms of the ultimate benefits achievable by the program, along with an incorporation of a wider range of factors that will contribute to the ultimate benefits.

To achieve its new objective of increased productivity, TEPP will provide information on all the topics that contribute to it: fuel efficiency, operational efficiency, improved safety, and clarification of regulations. Dealing with some of these topics, TEPP will act as facilitator in distributing and providing access to existing ministry information and know-how. This will be particularly the case with information about safety and regulation, areas where the ministry has active and extensive programs. TEPP will work with these programs to promote the use of available materials, and to help point out how safety improvements and better understanding of and adherence to regulations contribute to overall efficiency and help improve transportation productivity.

It should be stressed that along with the new objectives, energy efficiency remains a high priority in the new program, and pointed out that TEPP will retain the DriveSave, Trucksave, Municipal Energy, and Government Fleetsave programs. These programs will continue to develop information on new energy efficiency measures and promote the implementation of existing ones, as it is recognized that energy efficiency has a major effect on improving productivity.

The new activity areas of operational efficiency, safety, and awareness of regulations, will be introduced by these programs to complement existing ones and to enhance the benefits of the programs. The final overall approach of all TEPP subprograms will be to focus on the true "bottom line" of increased transportation productivity and greater profits.

"Efficiency Pays" Contest

To help launch MTEEAC's new emphasis on energy efficiency, we would like to know about your strategies to implement efficiency and conserve energy. Please see the flyer mailed with this issue announcing our "Efficiency Pays" contest.

Bus Bays: The Pros and Cons

A bus bay is a local widening of the roadway sufficient in size to permit a bus to pull in and load or unload passengers, resulting in minimal traffic interruption.

In Metro Toronto, there are 1484 bus bays at bus stops. That translates into 15 percent of the 9000 bus stops in Metro. They are constructed by either Metro Toronto or by the area municipality, upon approval from the Toronto Transit Commission (TTC).

The points in favour of bus bays are:
- reduction of accidents;
- improved traffic operations due to increased traffic flow;
- improved safety at stops due to continuity;
- improved safety at the bus stops at the bottom of steep grades.

They also have negative effects, however:
- the bus must re-enter regular traffic, causing slowing of transit movement, which could cause riders to abandon public transit and increase the number of low-occupancy vehicles;
- increased transit operating costs;
- potential danger to pedestrians crossing at a croswalk.

There is also the question of bus bay location. There are three possible locations for a bus bay: nearside of the cross street, farside, and mid-block. In general it is believed that at an intersection, the nearside location is preferred.

However, if there is a crossover* on either side of the intersection, it seems that the safest place to locate a bus bay is on the side opposite the crossover, whichever that may be -- nearside or farside.

When a bus stop is at the nearside location, the pedestrians at a crossover on the same side may be endangered by the oncoming traffic as the bus may block motorists' view of the pedestrians.

If the stop is moved to the farside, and the crossover remains on the nearside, motorists' view of pedestrians is clear and there is less risk of them being hit.

This would suggest then that all bus stops should be moved to the farside location. The TTC does not necessarily agree with this proposal because locating the bus stop beyond the crossover could invite jaywalking, which is also a hazard. Further, an intersection may exhibit both nearside and farside bus stops, to facilitate transfers for bus passengers.

The TTC has attempted to ensure public safety by increasing the minimum space between a crossover and a bus stop from 9 to 12 metres.

In a further attempt to ensure public safety, it has been proposed that all Ontario's crossovers should be made self-actuated so pedestrians can press a button and two amber lights would start flashing, and warn drivers that the crossover is in use.

This approach is not problem-free, however. For example, if drivers are conditioned to respond only to the flashing lights, will a pedestrian who forgets to press the button be at greater risk? Will a pedestrian who presses the button assume that he/she can start crossing the street immediately, ignoring the fact that traffic cannot stop instantaneously?

** Note: a crossover refers to a designated pedestrian crossing marked with a large overhead X sign, while a crosswalk refers to a regular crossing at an intersection.*

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Roads Inventory Management System – RIMS

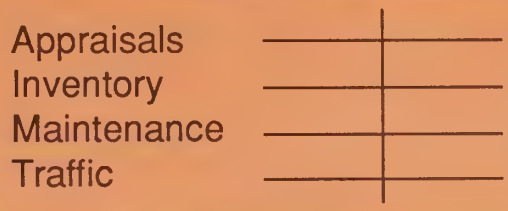
RIMS can vastly simplify the gathering, inputting, and tallying of the road inventory data that municipalities send to the Ministry of Transportation of Ontario (MTO) each year in order to receive their portion of the road subsidy.

The current method of distributing dollars to upper and lower tier municipalities through the Municipal Roads Office's Roads Needs Study is about to be improved by RIMS. Currently, each municipality in Ontario has to do a yearly study and a major update every five years. During the major update, a cost of construction is determined for each different road section based on average costs in a district. The overall construction costs are increased yearly, then revised during the next five-year update.

For several years, this system has been inadequate. Within the Municipal Roads Office, there is a need for more current and more accurate data and a better means of costing improvements. Also, the Municipal Engineers Advisory Committee brought to light the fact that Municipal Engineers need a great deal more information than is included in the Roads Needs Study. For these reasons, it seemed an ideal computer application.

Through a joint committee of the Municipal Engineers' Association, the Ontario Good Roads Association, and the Ontario chapter of the American Public Works Association, a task force was formed in 1986 to oversee the implementation of such a system. The goal was defined: provide a comprehensive computerized inventory system for both historical and current road data, provide complete integration with the MTO Roads Needs Study, and provide for a transfer of data to other related activities, such as pavement management, sewer and water programs.

RIMS Modules



In December 1987, the task force commissioned Buckley Fraser Williams Inc. to develop the Roads Inventory and Management System, which is now available to municipalities.

The main benefit of the new system is that the municipalities can keep and use the data, as well as send it to MTO. MTO used to produce ten reports that arrived six months after submission of the revised data, whereas the new procedure will be instantaneous. The municipalities' submissions will be on disk, instead of on a stack of papers to be input into a computer at MTO. In this way, the data stays with the municipalities and in a form that can generate reports in answer to queries. This ability to generate reports makes RIMS an efficient management tool. If, for example, a councillor or alderman wants to know how many deficient sections are in a ward and how much it is going to cost to replace the roads, finding out is as easy as creating the report and waiting for the printer to start.

MTO's Municipal Roads Office is currently developing a new information management system that will accept Roads Needs Study data in an electronic format. Municipalities may submit their Roads Needs Studies on any computer system as long as it

Continued on Page 3...

Mobile Information Systems

Due to recent advances in micro-electronics, automotive and traffic control technology will soon include the fascinating and fantastic applications described in this article.

A combination of vehicle-based and street-based components can provide constantly changing, up-to-the-minute information to the driver.

Imagine this scenario: As you sit in your car, and after you have entered your destination code, you see a map display on a screen. The screen may be in a console, mounted inside or on the dashboard, or may take the form of a plastic sheet laminated onto the windshield with a holographic lens creating the display. Audio chimes or instructions draw your attention to the visual display. Spoken instructions by pre-recorded messages, a digitized and/or synthesized voice accompanies the visual instructions. The on-board computer tells you where you are, how far you've come, how much distance remains, and what is the best route to your destination.

To provide all those functions, the micro-processor needs information from various sensors and on-board databases containing road networks and other information. The storage devices that are currently in use or being developed are cassettes, removable compact disks, permanent CD-ROM, etc.

Basic positioning/navigation systems may be completely self-contained, for example, based on dead-reckoning and map matching (to correct accumulative errors). But the more complex, dynamic mobile information systems involve three-way communication between the vehicle, the road side, and control centre. Such a system can provide current and changing information to the driver such as weather conditions, incident locations, and traffic congestion levels. The vehicle's computer can receive this information from proximity devices along the route: loops buried in the roadway, electronic signposts, or beacons attached to traffic signals or road signs. The control centres transmit the information to the proximity devices which in turn transmit to the vehicles. No Canadian city has yet installed such devices; the Toronto Transit Commission uses them for its own bus monitoring purposes, however.

Another application of mobile information systems exists in fleet management. Vehicle and cargo position tracking, route guidance, and driver training feedback can improve the efficiency of fleet management. In addition, stolen vehicles can be located and recovered with a type of homing device.

Traffic problems such as congestion can be better managed once mobile information system units are widely installed in automobiles and trucks. Transmitting alternative routes to the vehicles would help greatly with street and freeway management. Also, the monitoring of vehicle speeds could significantly improve road safety.

Mobile information systems can turn a vehicle into a mobile office, which is ideal for commuters or salespeople who spend a large part of their work day in a car. For passengers in car or vanpools, mobile information systems can offer in-vehicle computer work stations, word processing, telemarketing, client lists, the use of fax machines, and other features that will turn the car into a temporary office.

For passengers who aren't part of the office, there could be entertainment: games or language training courses. The CD-ROM type storage devices will probably contain encyclopedia and music disks and hitch-hiker registration. The units can even support some health care needs: simple diagnoses of heart rate, driver alertness, and diet information can be made available. Vehicle-to-vehicle communication will enable drivers to clearly and personally express sentiments previously limited to hand gestures.

The apparent benefits of mobile information systems are numerous. However, this new technology does present some concerns: the ability to monitor vehicles and drivers much more closely, especially in fleet management applications, may be seen as a threat to privacy. Many people think that this "Big Brother" type of monitoring is a violation of worker rights. There is also a risk of

Continued on Page 3..

RIMS cont. from page 1

meets the format specifications of the ministry. However, the price of RIMS – $300 – is lower than the cost of writing your own program.

The ministry requires an annual update to reflect new features or lengths added, items removed, revised road conditions, and replacement costs. RIMS can receive and store this information and subsequently provide machine-readable input to the ministry's information system.

RIMS is modular in nature. It has nine modules: MTO Needs Appraisals, Inventory, Maintenance,Traffic, Legal and Land Use, Report/Query, Admin/Info, Utilities, and Geographic Information System (GIS).

Any of the inventory items can have a maintenance task associated with it and work orders generated.

While the first task of RIMS is as an inventory database, it can also provide a link to other applications.

Link to Other Maintenance Programs

RIMS records the road allowance in road sections and establishes a comprehensive road index. This index includes a suffix to divide the road allowances into sections. Sections usually break at major intersections.

Users can, however, add codes to allow the grouping of data according to wards, maintenance areas, local subdivisions, etc.

Link to Geographic Information Systems

RIMS provides a means to link the road inventory and history data to a computerized mapping file.

The XYZ co-ordinates for any or all items located on the road allowance can be recorded. Any item can be located and recorded by determining the distance along the centre line of the road allowance or roadway and the offset from that point. Distance is determined from an established point at the start of the road section. Once the co-ordinates of the start point, the distance, and the offset are known, the precise location of any item can be determined.

Every item on the road allowance can be spatially positioned and linked to mapping. This makes it possible to use RIMS data as an attribute file in conjunction with a mapping or graphics file. Further, data can be down-loaded in batch or on-line to graphically display items inventoried in RIMS.

Link to Other Engineering Requirements

RIMS provides a comprehensive record of any or all features on the road allowance. Further, as previously indicated, it accommodates positioning or location for each of the features. This data can be used as input to a variety of non-maintenance activities. Analysis of street lighting patterns, accident statistics, traffic volumes, public inquiry responses, legal and land use data, and capital budget planning are just a few examples.

Link to Pavement Management

The street index with section length identification is a direct link to pavement management; the section identification in RIMS can be set up to correspond with pavement management sections.

Why Buy RIMS?

RIMS is a comprehensive and flexible management system that includes inventory, report and work order generation, and links to other systems. It can be tailored to suit the needs of each municipality and offers a much improved way to submit Roads Needs Study data to MTO.

So far, 145 municipalities have bought the RIMS software package. For more information or to place an order for RIMS, please contact:
Mr. Trevor Lewis,
Town Engineer
Town of Lindsay
Tel: (705) 324-2712
Fax: (705) 324-2051

Mobile Info cont. from page 2

drivers learning to base many of their decisions on a machine, which like all machines, is liable to break down occasionally.

The human factor is another issue to be considered. Humans are fairly limited in their capacity to process large amounts of information. If they are confronted with a barrage of instructions in an emergency, they may become confused. Unfortunately, little research has been done on the overall safety of these systems. Careful studies must be made, for example, to determine the best position of the screen so as not to distract the driver's attention and to minimize eye movement away from the road.

Also, the use of voice recognition may be a great security device, but if required in a stressful situation, it may be ineffective.

Presently, Japan, Europe, and the U.S. are leaders in the research and development of this technology. If Canadian companies wish to participate in this vast future market, they will have to become involved right away to take advantage of the opportunities left.

If you are interested in hearing more about this technology and its application, plan to attend the upcoming VNIS '89 (Vehicle Navigation Information Systems) Conference, co-sponsored by the Ministry of Transportation. The conference will take place September 11-13 in Toronto. The demonstrations from Europe, Japan, and the U.S. are certain to present an interesting look at the most recent advances in mobile information systems.

The 1989 Mount Forest Trade Show, sponsored by the Association of Ontario Road Superintendents, was a huge success. On June 8th and 9th, approximately 4,000 people filtered through the Mount Forest Arena grounds to see the many interesting and diverse displays.

There were some changes from last year's show in Niagara Falls. This year was the first time that awards of merit were presented to participants – K-Brand Products of Mount Forest won the award for the best indoor display and Clemms Industries of Kitchener had the most impressive outdoor display.

This year there were live outdoor demonstrations for the first time. JCB displayed a JCB 1400 wheel loader backhoe, and John Deere presented an extremely flexible 770 BH Motor Grader. Probably the most interesting and unusual demonstration was the four Bobcat 743 Skid Steel loaders performing a traditional ho-down square-dance. These Bobcats nimbly bowed, do-si-doed and paraded around the performance area, much to the amusement of the spectators.

Next year's Trade Show, "Spotlight 90," will be held in Peterborough's Memorial Community Centre on June 7th and 8th, 1990. If you're in the area, it's worth attending.

The MTEEAC newsletter is a publication of the Ministry of Transportation, Transportation Energy and Productivity Office

Ontario Ministry of Transportation
William Wrye
Minister

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MTEEAC NEWS

Fall
1989

MUNICIPAL TRANSPORTATION ENERGY AND EFFICIENCY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES AND THE PROVINCE OF ONTARIO

Vol. 8
No. 3

The Future Doesn't Work . . . . Or Does It?

The following article is published as an individual's point of view; the opinions expressed do not necessarily represent the views of the MTEEAC committee.

By Louis Shallal, P Eng, PhD
Director,
Transportation Planning Division,
Regional Municipality of
Ottawa-Carleton

Are we doomed to be dominated by the needs of our automobiles?

In his article,"The Future Doesn't Work," which appeared in the November/December 1987 issue of *TR News*, Douglas R. Porter contends that the word "growth" has become a nasty word and that developers are being pressured as never before to slow down and scale back their proposals. He attributes this reaction to the traffic congestion generated by this growth and refers to this traffic generation and congestion as the Traffic Crisis. He claims that communities, trying to overcome the traffic crisis, actually perpetuate it and gives several examples of this situation. He goes on to claim that planners' solutions, which involve higher densities to attract people to public transit, get rebuffed by community attitudes against high densities and for wide open space to allow a certain style of life. Thus he arrives at his second thesis: that there is no decent model of what constitutes a proper balance of density, growth, and congestion. He concludes that what we need is a vision to allow a more reasonable discourse about the future of the suburbs and that without such a vision, we are doomed to be dominated by the needs of our automobiles, which are dictating how land is developed. He claims that we should learn that the only traffic solution is ultimately a land use solution. This, in a nutshell, is the argument that Porter advanced in his article.

While I have no specific argument with Porter's contention, I believe that the issue is perhaps more than simply that of the use of land. Planners, however, will tell you that they do not lack vision. They will refer you to mountains of articles written in the planning literature and they will tell you that the problems are complex and require complex solutions.

Most planners will tell you that the social ills facing our urban areas go back to the various booms that took place over the past few decades, starting with the Baby Boom after the second world war and including job booms due to significant growth in industry and other service jobs as well as the infusion of women into the work force. These high-growth phenomena, whether positive or negative in terms of their impacts on the urban form, have dictated the way that our cities look now.

Planners are convinced that the patterns of growth and impacts that we've seen over the last few decades will persist through the remainder of this century and into the next.

(Continued on Page 2...)

(Cont. from page 1)

The transportation implications of these growth patterns are phenomenal. The desire to travel and to commute has been increasing at a rate much faster than the growth in population or growth in jobs. Some refer to our love affair with our automobiles as a "fatal attraction." The pattern of commuting itself has changed significantly from the old suburb-to-city-centre pattern of the pre-1950s, to suburb-to-suburb commuting patterns dominated by the private automobile in the 1980s. The public transit system, while somewhat significant in specific urban areas, continues to have a fairly minor role in most North American cities. Planners will also tell you that the role of public transit is unlikely to show a dramatic change unless technology or some new development patterns emerge. This is highly unlikely. Recent studies even suggest that we "plan for congestion" and contend that it is better for our cities than system expansion, which in turn generates more congestion.

One interesting observation is that in certain towns, although populations may actually decrease, congestion continues to occur and the need for additional transportation facilities prevails. This is perhaps an indication of the error in assuming that travel demand is a consequence of population growth only. In fact, some transportation planners hold the belief that transport policies are more likely to determine congestion than travel demand.

It is interesting to note that in large metropolitan areas such as Toronto, a lot of the infrastructure, particularly the road facilities, built over the last few decades to cater to growth and urbanization, was intended to link cities together to increase their competitiveness and to facilitate the movement of goods from one centre to another. However, there is tremendous competition for use of these inter-city facilities; competition between commuters and workers, long distance inter-city travellers, and commercial goods movement. This competition will likely lead to demands to segregate, widen, or build additional infrastructure.

One last observation, but by no means the least, is that once a transportation system is built, it requires maintenance. The story of the crisis in highway maintenance is well known to most readers. The cost of rehabilitating and maintaining the assets of the nation is consuming the greater part of the total budget available for the transportation sector. In certain municipalities a very small fraction – perhaps less than 5 percent – of the total dollars available for the transportation service is available for systems expansion. Unfortunately, the political reality is that maintenance and rehabilitation projects are not visible political activities that capture attention – and votes – the way building new highways does.

So what's the answer? Is it true that the future does not work? It is not enough to simply state the problem. It is not enough to hope that "somehow" attitudes will change or that a new breed of administrators of public purses will emerge to rectify the problem. It is not enough to try to "educate" the politicians on the implications of their decisions. I think we need to understand the "needs" of the "voter," who influences these decisions. I believe the answer lies in going back to fundamentals.

We must understand the individual's needs and develop from those needs a building block for the kind of system and service that should be provided. A distinction must be made between what the individual needs and what he expects. In many areas of human indulgence, individuals' expectations can be very high. However, the basic needs can be much more down to earth. Consider the area of housing, for example. An individual may *expect* to earn a living so that he can afford to have a large multi-story home with numerous rooms and washroom facilities, but his basic *needs* might be simply shelter with the rudimentary necessities.

Unfortunately, as in housing, the travelling public, who have been brought up to expect that a journey from A to B should be made with no obstacles, become extremely agitated when they discover that congestion along the way brings those expectations to a halt.

What I'm saying is that we need a level of service indicator from the travelling public as to what the individual considers to be a satisfactory level and for which the individual is willing to pay. The complexities of the additional uses of the transportation system, by commercial and other traffic, are not forgotten. However, I believe that the building block based on the individual's need must be developed if we are to arrive at a suitable answer to the dilemma we face in our urbanized areas.

Readers are welcomed to submit a counterpoint to this intentionally controversial article or their perceived solutions to this problem. ■

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Plan On It

This article is directed at municipalities with populations under 10,000.

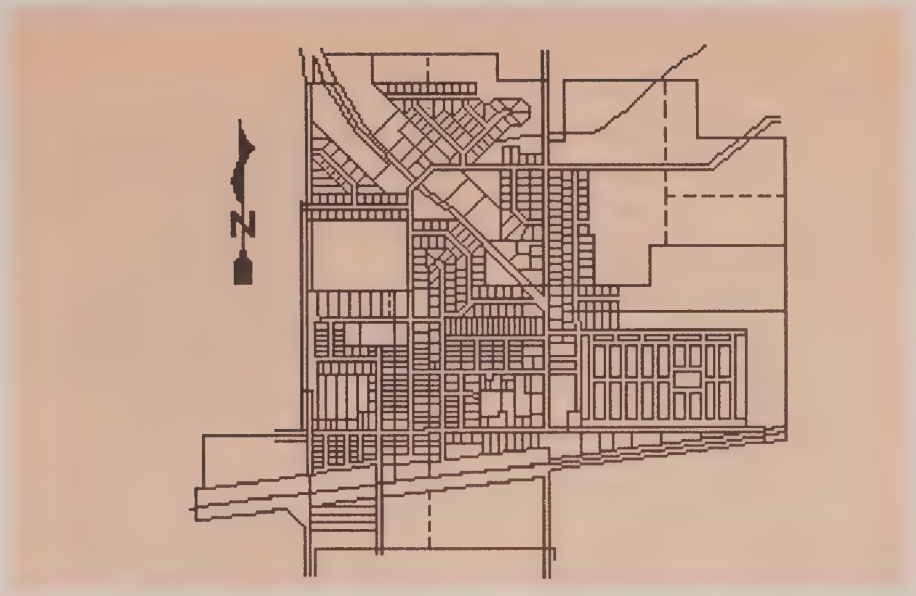
Planning is a great thing – everybody plans at least some aspect of his or her life. Whether it be the household budget, travel, marriage, or children, the benefits of planning are obvious. It allows you to organize the achievement of your goals with a minimum of mistakes. Planning saves time, effort, and money.

Community planning is done on a larger scale than the household budget, of course, but it proceeds on the same principle of defining achievable goals. Community planning is designed to keep expansion of the community orderly and to avoid sporadic growth, which leads to waste, ugliness, and a costly infrastructure. A plan shows where money is needed most and where it can be best used. In addition, it keeps the plans and desires of the government, private land owners, and business coordinated.

There are many good reasons for planning. For example, when changes to the community, such as growth, are inevitable, planning allows people to influence changes in the appearance, economy, and social life of their community.

Planning also helps people to see the link between the economy, housing base, environment, even the local history and problems as diversified as unemployment, traffic congestion, and water pressure.

Another benefit of community planning is the coordination of community objectives. Communities can avoid situations in which people build homes only to find themselves the incompatible neighbours of industries. Also, developers or individuals seeking to build homes can become aware of such environmental features as flood zones, plans, and other environmental constraints before development is started.



Community planning is designed to keep expansion of the community orderly and to avoid sporadic growth.

In spite of the many good reasons to plan, there are times when planning is so narrowly focused that it can work contrary to community objectives. For example, communities should not plan with the intention of attracting particular industries. Many industries are wary of communities that exclusively plan for industry and ignore the need for residential and community facilities for their workers.

Community planning should not be initiated in order to achieve immediate changes and benefits at the expense of long-term losses. The short-term benefits are often slight and may be disappointing; also, changing needs must be taken into account. It is the long-term achievement of goals that makes community planning worthwhile.

Don't plan because it's popular or because everyone else is doing it. In order for community plans to work, the support of the community and the coordination of its activities are required.

Do not use planning as a shortcut to zoning. A hastily drawn up, basic plan quickly followed up with a zoning ordinance will not work as effectively as a carefully prepared plan providing direction and goals for the zoning ordinance.

Finally, community plans should not be made to support individual interests, "stabilize" ethnic groups, or restrict mobile home and junkyard locations. This type of planning will most likely result in an expensive legal battle and become a divisive issue within the community.

The common and pressing problems that communities want to solve are often bigger than anticipated and require cooperative efforts between neighbouring communities or within an entire county. While cooperation is a good idea, perhaps the feeling of pride, security, and accomplishment that residents have toward their community is the best reason for putting effort into community planning.

Planning makes people feel more in control and sure that their community is being managed with a caring attitude. It is this caring atmosphere that will encourage a community to expand, build new residential areas, and attract desired industries. ■

Research On Snowdrift Control

Reprinted from *R&D Reports*, Vol.1, No.4

As any Ontario driver knows, winter storms can rapidly lead to hazardous driving conditions. Currently, the Materials Research Office of the Ministry of Transportation (MTO) is undertaking a series of studies related to the control of drifting snow. The principal aim of the research is to alleviate winter hazards and create safer driving conditions.

Modelling studies are being conducted, which will help incorporate special design features into new highways to minimize the effects of drifting snow in the long run.

Existing problems can be diminished using a variety of methods: the installation of temporary snow fences; the planting of snow hedges and windbreaks; and the reconstruction of short stretches of road with cross-sectional geometries designed to prevent the accumulation of snow on the pavement.

The development of these treatments involves a combination of laboratory and field studies. Laboratory studies use water flume tanks in which a scale model of the problem site is subjected to a variety of simulated wind and snowfall conditions to find the optimum treatment. Field studies are conducted parallel to the laboratory test. They help calibrate the models by accounting for such factors as wind currents generated by traffic and physical changes in the snow pack that cannot be accurately modelled in the flume tank.

A study to optimize the use of snow fences is another area of research that involves field work. Factors that contribute to the effectiveness of snow fence operation include:

- placing the fence with respect to highway alignment, prevailing winds, and surrounding topography;
- developing improved methods for installing fence posts and for securing fences to the posts; and
- selecting the best materials for fence construction.

Man Made Obstructions – *Snow accumulation can be controlled by installing snow fences to obstruct the wind and collect blowing snow particles.*

Natural Obstructions – *Terrain features protect the roadway surface by positioning drifts on their leeward side.*

This study will help optimize siting and installation practices and will be a basis for revisions to MTO's Maintenance Operating Instructions. The quality of fencing materials will be addressed through the development of snow fence performance specifications and listings in the Designated Sources Manual.

The federal government's Transportation Development Centre is currently incorporating Ontario's technical expertise into a manual for snowdrift control. The manual will guide maintenance crews country-wide as they determine appropriate treatments for problematic roadways. In addition, it will assist in the operational design of the selected treatments.

Long-term research at MTO focuses on the development of a computer simulation model to predict the probability of blowing snow, the form of snowdrifts, and the possibility of whiteout conditions at a given site. This system will assist the Regional Planning & Design Offices to minimize the potential for snow-related problems before new highways are built. The computer system will also aid the Maintenance Branch to develop remedial treatments for existing sites.

The system builds on existing models developed at universities and federal government laboratories, which predict the mechanics of snow transport, the effects of local wind, and the metamorphosis of snow. These models are being incorporated into an interactive software program for use by MTO roadway designers and engineers.

Highway authorities have a difficult task trying to minimize the hazards created by fickle nature. However, the design tools and remedial treatments for snowdrift control under development by the Materials Research Office will make this task more reliable, economic, and time-efficient.

For further information, please contact Max Perchanok of the Research and Development Branch of MTO at (416) 235-4680. ■

The MTEEAC newsletter is a publication of the Ministry of Transportation, Transportation Energy and Productivity Office

Ontario

Ministry of Transportation
William Wrye
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MTEAC NEWS

Winter/Spring 1990

MUNICIPAL TRANSPORTATION ENERGY AND EFFICIENCY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES AND THE PROVINCE OF ONTARIO

Vol. 8
No. 4

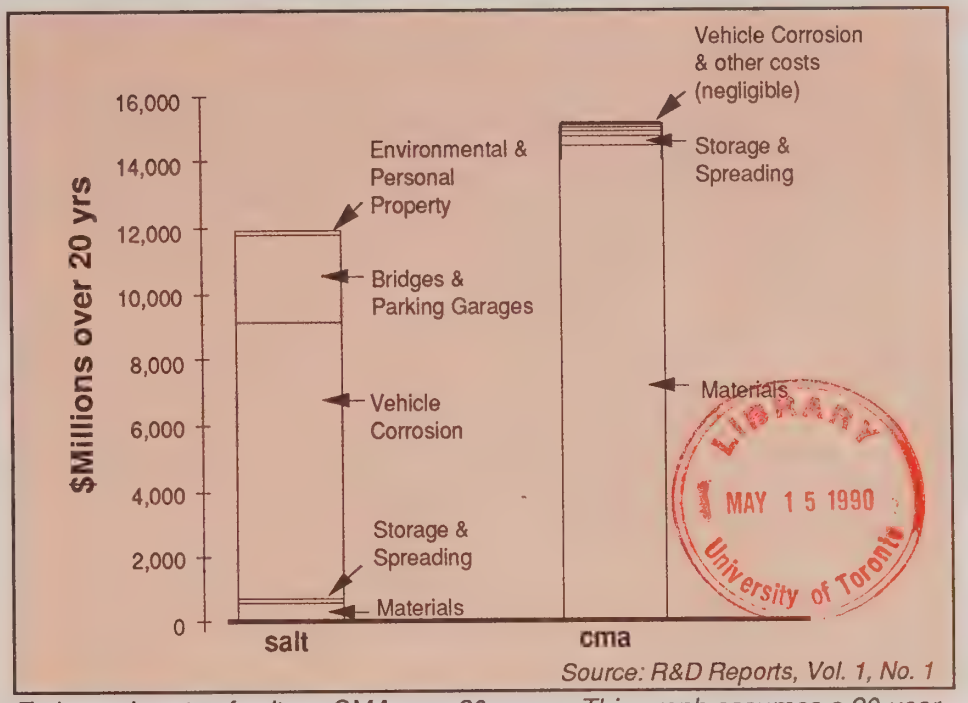
In Search of an Alternative to Road Salt

The public expects the Ministry of Transportation of Ontario to have the roads cleared and de-iced within three to four hours after a snowfall. Yet at the same time, there are protests at the use of rock salt for de-icing: "It corrodes my car," and "it's bad for the environment." Unfortunately, there are few de-icing alternatives for the ministry to choose from.

But why do we use salt at all? The main reason salt is applied to a road surface is to form a brine that breaks the bond between the snow and/or ice and the pavement. Once the bond is broken, the snow and ice can be removed by mechanical means. Occasionally, of course, salt is spread to melt ice and remove a hazard but, most of the time salt is used so that snowploughs can remove snow and ice.

The problem with rock salt is that it is 99 percent sodium chloride and, when dissolved, releases sodium and chloride ions that can be harmful to the environment, vehicles, and road structures. The chloride ion is one factor that contributes to the corrosion of vehicles and structures, while sodium can contaminate drinking water. Both types of ions can cause damage to vegetation as well. Because of these environmental concerns, the ministry is trying to find suitable de-icing alternatives.

The ministry has estimated that the indirect costs due to the adverse effects of salt are about $900 million per year in Ontario. That figure does not include the cost of the salt itself. An acceptable alternative de-icer must not only be as effective, but the total costs (direct and indirect) must be less than for salt.



Estimated costs of salt vs. CMA over 20 years. This graph assumes a 20-year period, 5 percent discount rate, and 0 percent growth in use.

In addition to cost, the three basic criteria the candidate de-icer must meet are as follows:

- It must be an effective de-icer
- It must be safely and easily. stored, handled, and spread.
- It must have minimal adverse environmental effects.

It is a common misconception that sand can and should replace salt. Sand is used simply as an abrasive to increase friction on slippery roads and studies show that it is ineffective at that. Sand also has serious environmental effects related to water pollution and spring cleanup.

One alternative de-icer that has generated interest is calcium magnesium acetate (CMA). CMA is manufactured by reacting dolomite with acetic acid. This gives CMA its long-term potential as an alternative to salt because none of its components are harmful to the environment.

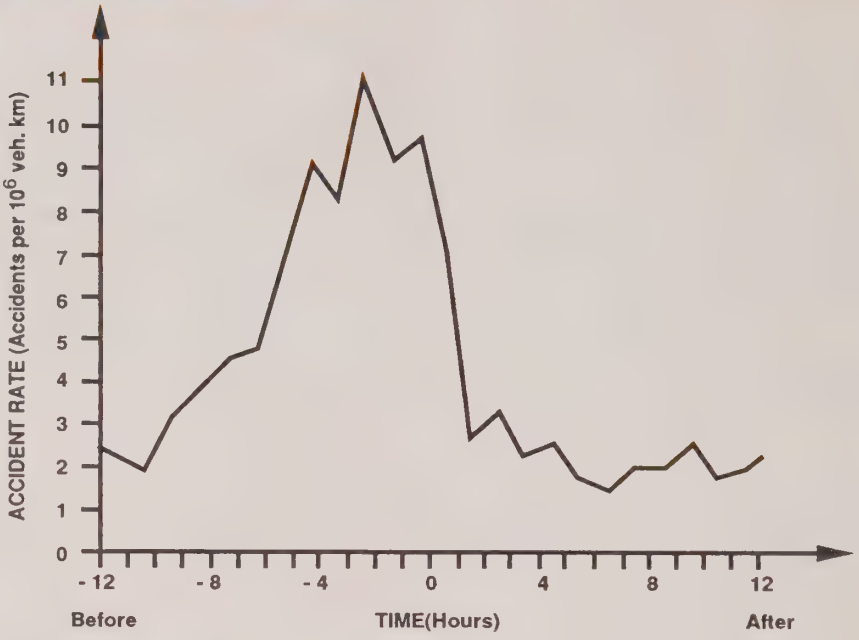
Unfortunately there are drawbacks: the cost of manufacturing CMA is estimated at $500 to $550/tonne, while salt only costs $30 to $40/tonne. The production of the acetic acid is what causes CMA to be so expensive. The ministry is trying to discover new and inexpensive sources of acetic acid; some interest-

(Continued on Page 2...)

Why Use Salt?

Have you ever considered what would happen if the ministry decided to stop salting the roads all together? For some idea, we could look at the results of a study, "Curtailing the Usage of De-icing Agents in Winter Maintenance" that was carried out in Germany and published in 1989 by the Organization for Economic Cooperation and Development (OECD).

The study was conducted over a four-year period on two sets of road sections with very light traffic load and low accident risks. In Test Area 1, on road sections totalling 350 km in length, no salt was spread and snow removal was done by mechanical means only. In Test Area 2, comprising 440 km in total, sand was used as an abrasive and salt was to be used only if the situation required, which turned out to be in over half the cases.



ACCIDENT RATE BEFORE AND AFTER SPREADING

A cost-benefit analysis of the number of accidents, the overall maintenance costs, and savings due to the decreased use of salt was carried out for the two sections of road.

In Test Area 1, winter maintenance costs fell by 60 percent, but nothing was being done to deal with the ice, which was a danger to drivers. The costs in terms of accidents and time lost far outstripped the savings in salt.

In Test Area 2, while the savings in salt amounted to 33 percent, winter maintenance costs rose by a factor of 2.5 because 23 percent more spreading of sand was necessary.

During the four-year period, accidents increased by 55 percent in the two test areas. Driving was considerably more dangerous in Test Area 1, where no salt was spread, than in Test Area 2: in Test Area 1, the number of accidents increased by 63 percent.

All in all, the curtailed winter maintenance on these roads generated a considerable increase in cost because of the increase in the number of accidents.

The graph on this page (published in the same study, although not using the data from the test areas discussed above) illustrates the positive effect of salt on reducing accidents. It shows the trend in accident rates before and after time "0" i.e., salt spreading. The risk of accidents is very high on snow-packed or icy roads (prior to "0") and quickly falls after the salt spreader has passed. The accident rate remains high during the first hour because the thawing effect of the salt is incomplete.

Although rock salt causes environmental concerns, this study shows that salt usage results in greater road safety and suggests that it may be the best choice for snow removal at this time. ■

(...Continued from Page 1)

ing possibilities are sewage waste and solid municipal waste.

Another drawback of CMA is that it does not work at low temperatures as does salt. Also, since CMA is less dense than salt, it is easily blown off road surfaces and has proven ineffective on snowpack.

Some other alternative de-icers the ministry is researching are calcium chloride, PM-20, Sodium Formate, Urea, Freezegard + PCI, Qwiksalt + PCI, and Rock + TCI. Fact sheets on these alternative de-icers are available free of charge from MTO's Research and Development Branch, Room 320, Central Building, 1201 Wilson Avenue, Downsview, Ontario M3M 1J8. Or call (416) 235-3480.

For now, because of the ministry's first responsibility to the public to keep highways safe, the ministry is left with no choice but to continue using sodium chloride. Although this de-icing method is the basis of some serious environmental concerns, it is the only method that is currently economically feasible. ■

Except for the Air Brake Endorsement article on the back page, this issue was written by Kim Deyarmond.

Training Videos Coming Soon

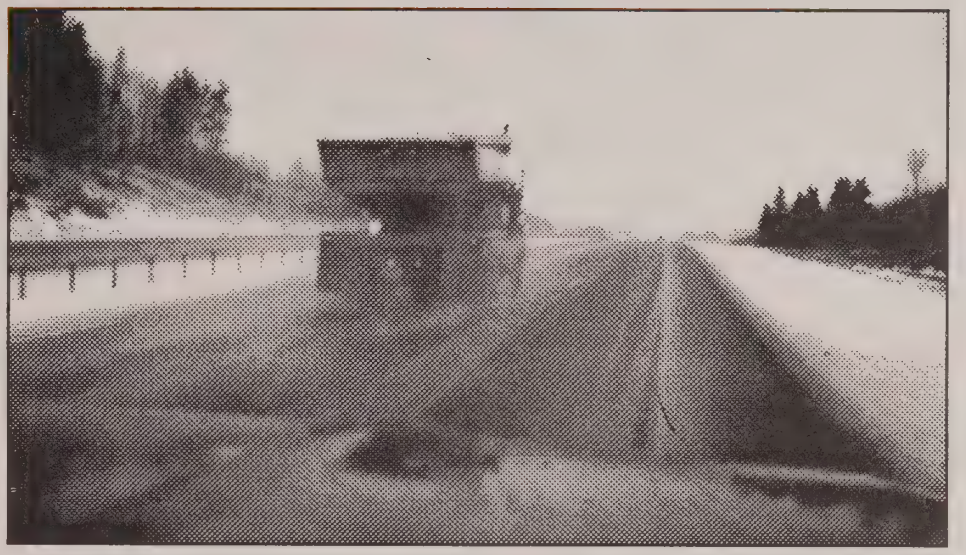
When Old Man Winter comes storming into town, the Ministry of Transportation's Transportation Energy and Productivity Office (TEPO) and the Municipal Transportation Energy and Efficiency Advisory Committee (MTEEAC) want Ontario's municipalities to be prepared.

TEPO and MTEEAC have combined their efforts to produce a series of training videos on winter control operations. The training videos are due to be released in the fall of 1990 and are intended for an audience of maintenance operators.

Over the years, each municipality has developed its own winter operations procedures based on past experience. These procedures vary from municipality to municipality and according to each staff member's preferred taste in equipment. This lack of a uniform operational procedure causes municipalities' efficiency rates to vary. Therefore, a training video would be useful to provide each municipality the opportunity to standardize winter control operations.

A steering committee was formed to oversee the production of these videos. The committee is comprised of both municipal and ministry personnel who have knowledge of various areas of winter maintenance. The steering committee members are:

- **Art Lake** (Chairman of the Steering Committee), General Superintendent, Maintenance and Service, City of London
- **Dave Moran**, Mechanic Superintendent, City of Sudbury
- **Gord Kerr**, Manager of Central Garage, City of Hamilton
- **Percy Hinze**, Maintenance Supervisor, MTO, Bancroft District
- **Frank Cherutti**, (Secretary of the Steering Committee), MTO.



A series of training videos on winter control operations will be available for next winter.

The steering committee developed the outline for the original script which was used as a starting point for the final version. The script was sent to several consultants to be used as a guide for their proposals to make the videos. Peter Maynard Film Production was awarded the contract. The committee will continue to work closely with the company's script writers and film crew until production has been completed.

The video series will consist of three separate topics: plowing; sand and salt spreading; and sidewalk maintenance. This way, municipalities or private companies interested in only one aspect of winter maintenance will have the option of viewing the subject of their choice.

The videos cover fall preparation, different types of equipment, correct operational procedures, and what to do on return to the yard. The entire series will also be available in slide presentation form.

Upon completion, this training material will be made available to all municipalities and private companies interested in the topic of winter maintenance. These videos should prove beneficial to all municipalities in preparing them to deal with anything Old Man Winter may bring. ■

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MTO's Air Brake Endorsement Program

Reprinted from *Tech Topics*, September 1989
Published by
The Ontario Good Roads Association

Many readers will know that the Ontario Ministry of Transportation (MTO) has introduced an air brake endorsement requirement for all drivers operating motor vehicles equipped with air brakes.

This endorsement has been given the short title of the "Z" endorsement. Many deadlines in start-up of the program have already passed including the last day to qualify for the grandfather provision (February 28, 1989 – more than 200,000 drivers were "grandfathered") and the mandatory compliance deadline or enforcement date (September 1, 1989).

This means that after September 1, 1989, drivers are not authorized to operate a motor vehicle equipped with air brakes (including air-over-hydraulic) on any highway unless they have obtained the "Z" endorsement.

Once a driver has obtained the "Z" endorsement by "grandfathering" or writing a test, he or she will be required to pass a written test at the time of each licence renewal (usually every three years). The ministry has waived the requirement for air brake endorsement testing on licence renewals until after April 30, 1990. However, if an individual does not presently hold a "Z" endorsement, he or she can get it only by passing the written test.

Most municipal employees operating trucks equipped witht air brakes will presently have the "Z" endorsement through the grandfather provision, but they will be required to renew it by passing the written test at the time of their next licence renewal after April 30, 1990.

Drivers can prepare themselves to pass the written test in one of two ways:

1. By enrolling in the ten-hour air brake course offered by most community colleges in Ontario and taking the test at the college at the conclusion of the course. Those readers aware of the difficulty of the test used prior to April, 1989, will be pleased to know that the exam has been revised to test the knowledge required by drivers and not mechanics, as was the case in the earlier version. On completion of the course and the passing of the test, the community college will issue a certificate which the candidate will present to the MTO Driver Examination Centre as proof of qualification for the "Z" endorsement. There would be tuition charged for the course.

2. Instead of enrolling in a community college course, the individual could choose to secure a copy of a booklet published by MTO, entitled *The Air Brake Manual* at any Driver Examination Centre and study on his/her own. To quote from the inside cover of the manual:

"It is imperative that everyone intending to attend a training course on air brakes, or applying for an air brake endorsement on their Ontario Driver's Licence, study this manual diligently."

The driver would then take the written test at any Driver Examination Centre when he/she feels ready. An appointment may be required.

Many municipal "Z" endorsement candidates will find a classroom setting with a qualified instructor a better place to prepare for the test. Others may prefer to study at home at their own pace. The home study route will require a great deal of dedication and discipline for those who have been "away from the books" for a long time. It is a decision each individual will have to make.

Fortunately, there could be a third choice for municipal employees who would prefer learning in a classroom setting but because of distance to the community college or other reasons would find it difficult to travel to the community college two or three times to complete the course.

The Kent County Road Superintendents Association arranged with a local community college to send a certified instructor to give the course at a central location to 60 or so municipal employees from various municipalities in Kent County. This seems an excellent idea.

OGRA will assist any municipality, group of municipalities or Road Superintendents Association to hold a local "dedicated" course by arranging for an MTO certified instructor to give the course at the time and location of their choice.

If your municipality, group of municipalities, or association thinks that 20 or so municipal drivers in the area would like to take the air brake endorsement training and write the exam in a local classroom setting at reasonable costs, contact Sheila Richardson, Executive Director, OGRA.

OGRA will mail notices, process application forms, collect fees and arrange for the instructor. The local group would only have to provide a list of potential candidates, pick a preferred time and date for the course, arrange for a suitable classroom, and be present at the start of the course to make sure everything is in order.■

The MTEEAC newsletter is a publication of the Ministry of Transportation, Transportation Energy and Productivity Office

Ontario
Ministry of Transportation
William Wrye
Minister

Transportation Technology and Energy Branch

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MTEAC NEWS

Summer 1990

MUNICIPAL TRANSPORTATION ENERGY AND EFFICIENCY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES AND THE PROVINCE OF ONTARIO

Vol. 9
No. 1

Sustainable Development: Planning for the Future

In light of increasing environmental concerns, an important question now facing Ontario and the world is, can we continue economic growth without exhausting the planet's resources?

Currently, sustainable development is seen as the key to achieving a balance between economic development and environmental preservation. The concept of "planning for the future" with anticipatory and preventive responses now seems more appropriate than the old attitude of "finding a cure."

In 1987, the World Commission on Environment and Development, chaired by Dr. Gro Harlem Brundtland, then Prime Minister of Norway, issued a report titled, "Our Common Future." In this pivotal document, the Brundtland Report, the now widely used phrase, sustainable development, was coined and defined as "meeting the needs of the present without compromising the ability of future generations to meet their own needs."

Sustainability implies a transition away from economic growth based on depletion of non-renewable resources and toward progress based on renewable resources over the long run.

In October 1988, Premier David Peterson announced the creation of the Ontario Round Table on Environment and Economy. Its objectives are:

- to support joint sustainable economic demonstration projects between government, industry, labour, agricultural, environmental and other interests;

- to commission research on measures to further sustainable economic development and to disseminate this information; and

- to develop a provincial sustainable economic development strategy.

By 1992, the Round Table will have a sustainable development strategy for Ontario in place.

Transportation Impacts

In response to the 1992 target date, the Ministry of Transportation has established a task force to develop a strategy on sustainable development that is applicable to all transportation operations within Ontario.

The transportation sector is the largest consumer of non-renewable petroleum products in Ontario, consuming about 55 percent. The automobile accounts for about half of this and, consequently, is a significant cause of many local urban air-quality problems such as smog and ground level pollution.

(Continued on Page 2...)

(...Continued from page 1)

Transportation also contributes to three global problems: acid rain, global warming, and high-level depletion of ozone. Nitrogen oxides from emissions are a major factor in acid rain formation. Carbon dioxide, which is the largest component of vehicle exhaust, contributes most to the greenhouse effect. Chlorofluorocarbons (CFCs) are the main cause of ozone depletion and contribute to the greenhouse effect. They are used in automotive air conditioners and either leak slowly into the atmosphere or are vented into the atmosphere when the vehicle is scrapped. Since they are quite stable compounds, they reach high altitudes where they react with and destroy the ozone layer. Common pollutants and their impacts are shown in Table 1 on the facing page.

Atmospheric Emissions

Canada is one of the largest emitters of carbon dioxide on a per capita basis. Ontario is Canada's largest energy user, dependent on fossil fuels for 80 percent of its energy use.

Energy-related CO_2 emissions can only be reduced by limiting energy consumption. In transportation, this can be achieved through a number of measures:

Alternative Fuels: Propane and natural gas produce less CO_2 than gasoline or diesel fuel.

Increased Transit and Carpooling: Transit and carpools use less energy per passenger-kilometre than single-occupancy automobiles and, therefore, produce less CO_2. Streetcars and subways powered by hydro or nuclear-generated electricity produce almost no CO_2.

Traffic Management: Measures such as high-occupancy vehicle lanes, preferential parking for high-occupancy vehicles, freeway traffic management systems (FTMS) for improved traffic flow and incident management, and others will have a positive impact on reducing fuel usage and CO_2.

Trip Substitution: Walking, cycling, or use of telecommunications will reduce CO_2.

Vehicle Technology: Changes to engine design, downsizing, and refinement of electronic controls still continue to improve engine fuel efficiency. As well, natural gas buses are starting to appear in urban bus fleets, which will also help reduce emissions.

Working within the sustainable development framework, Ontario municipalities can reduce the impacts of municipal activities on the environment, reduce the use of non-renewable resources, and increase the overall efficiency of activities that are carried out within the community.

The Municipality of Metropolitan Toronto will be sponsoring an "International Forum to Address Urban Environment/Sustainable Development Issues" in Toronto, June 15th to 20th, 1991.

This forum will provide an ideal opportunity for municipalities to learn more about sustainable development.

Trade Show 1990

The 1990 Trade Show, hosted by the Peterborough County Roads Superintendents Association, was quite a success. Approximately 1200 people visited over 150 indoor and outdoor exhibits during the two-day show June 7th and 8th.

The show, held at the Peterborough Memorial Centre, was an excellent opportunity for Roads Superintendents to come out and view various products and equipment. This year, one of the most interesting displays was a restored 1936 Caterpiller Grader, supplied by Victoria County. Valley Blades was recognized for the best indoor display and Winslow-Gerolamy Motors was recognized for the best outdoor display.

Peterborough County Roads Superintendents sponsored four $250 draws. The winners were Doug Fredrick of Powassan, Keith McMunn of Perth, Glen Ferguson of Napanee, and Ronald Smith of Haliburton.
Next year's show will be held June 5th and 6th in Walkerton, at the Community Centre. Hope to see you there!

Global Warming: Government, Industry, and Individuals Are Called to Action

The success of sustainable development – planning for the future of the environment – depends on the cooperation of all sectors of society. Gradually, Canadians are beginning to realize not only that many of our actions have adverse environmental impacts, but also that we have the power to shape the future state of the environment.

There is a strong consensus that global warming is accelerating at a rapid rate. Even if gas emissions around the world were cut to zero today, there may be global warming by several degrees within 50 years because of the concentrations already in the air.

Put simply, global warming, or the greenhouse effect, is the trapping of heat by gases in the earth's atmosphere. The sun heats the earth and the earth radiates some of this heat into outer space. Scientists believe that this radiated heat is being absorbed by certain gas molecules in the atmosphere, rather than escaping into space.

As discussed in the accompanying article on sustainable development, carbon dioxide constitutes about half of the greenhouse effect and its concentration is increasing at 3 to 4 percent per year. At this rate, a doubling of CO_2 in the atmosphere is expected in the years between 2030 and 2050. Ninety percent of all CO_2 generated in Canada is due to fuel usage. Table 2 shows a breakdown of CO_2 sources.

Gases Responsible for Increased Heating in the Atmosphere

GAS	CONTRIBUTION
Carbon Dioxide (CO_2)	49%
Methane (CH_4)	18%
Chlorofluorocarbon (CFC)	14%
Nitrous Oxide (N_2O)	6%
Others	13%

TABLE 1

Percentage of Carbon Dioxide Generated by Burning Fuel

USE	PERCENTAGE
Power Generation/ Energy Production	28%
Transportation	24%
Industry	20%
Residential/Commercial	18%
Non-Energy Contribution	10%

TABLE 2

Accelerating temperatures indicate that we may already be starting to experience the impacts of global warming. The potential impacts of global warming are serious: rising sea levels, more intense storms, increased floods and erosion, and lengthened summer dry periods, which could affect or even destroy some plant and animal species.

In June 1988, the Conference on Changing Atmospheres held in Toronto recommended a 20-percent reduction of current CO_2 production levels by the year 2005. Canada is considering accepting the 20-percent reduction target, which may form a part of its sustainable development strategy, to be announced by Environment Canada later this year.

The Province of Ontario's objectives with regard to global warming are to:
- reduce emissions of greenhouse gases;
- absorb carbon dioxide; and
- conduct and stimulate research and analysis.

There does not appear to be one clear-cut solution to the global warming dilemma, however, cooperation by individuals, private industries, and all levels of government should, at the very least, reduce the magnitude of the problem. We are all responsible for cleaning up the environment. If we fail to do so, global warming may become unstoppable.

If you would like more information on global warming, please write to:

Global Warming
Ontario Ministry of Energy
56 Wellesley St. W.
Toronto, Ontario M7A 2B7

Or telephone
in Toronto: 965-3246
Province-wide: ZENITH 80420

If you'd like to receive this newsletter, or know someone who would, please fill out this form and mail it to:

Frank Cherutti
Executive Secretary
MTEEAC
3rd Floor, Central Building
1201 Wilson Avenue
Downsview, Ontario
M3M 1J8
(416) 235-5030

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Name: _____

Title: _____

Company: _____

Address: _____

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Winter Maintenance Videos Completed!

When those cold winter storms hit, the Ministry of Transportation's Transportation Energy and Productivity Office (TEPO) and the Municipal Transportation Energy and Efficiency Advisory Committee (MTEEAC) want Ontario's municipalities to be ready for battle.

That's why TEPO and MTEEAC have produced a series of training videos on winter control and operations. These one-of-a-kind training videos have been completed and will be released in September 1990.

The video series consists of three topics: plowing, sand and salt spreading, and sidewalk maintenance. With each topic being around 20 minutes long, municipalities or private companies interested in only one aspect of winter maintenance will have the option of viewing the subject of their choice.

Fall preparation, various types of equipment, correct operational procedures, and what to do on return to the yard are discussed in the videos. The entire series is also available in slide presentation form.

The video series will be especially beneficial to maintenance operators. In the past, each municipality had its own winter operations procedures and efficiency rates varied from municipality to municipality. By standardizing winter control operations, the training material will provide many advantages to Ontario's municipalities.

A steering committee, comprised of both municipal and ministry personnel, was formed to oversee the production of these videos. The films were produced by Peter Maynard Film Productions.

Interested municipalities or private companies can reserve copies of the videos for a three-week loan at no cost by filling out the form below. Also, feel free to make copies to keep for your own use.

I'd like to borrow the winter maintenance video for a three-week, free-of-charge loan.

SEND TO:

Frank Cherutti
Executive Secretary
MTEEAC
3rd Floor, Central Building
1201 Wilson Ave.
Downsview, Ontario
M3M 1J8
(416) 235-5030

Name:_____
Municipality:_____
Address:_____
_____
_____
_____
_____
Phone:_____

1990 Ontario Planners' Convention

The upcoming 1990 Ontario Planners' Convention is to be held in Ottawa at the Radisson Hotel on October 29th and 30th. This year's conference is hoped to be the first of an annual affair sponsored by the Ontario Professional Planners Institute (OPPI) for members and non-members of the institute. This year's theme is "Planner as Visionary."

Further information can be acquired from Mr. Nick Tunnacliffe, Conference Co-Chairman at (613) 560-1228 or Mr. Ray Essiambre, Conference Co-Chairman at (613) 834-1590.

The MTEEAC newsletter is a publication of the Ministry of Transportation, Transportation Energy and Productivity Office

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Vol. 9 No. 2

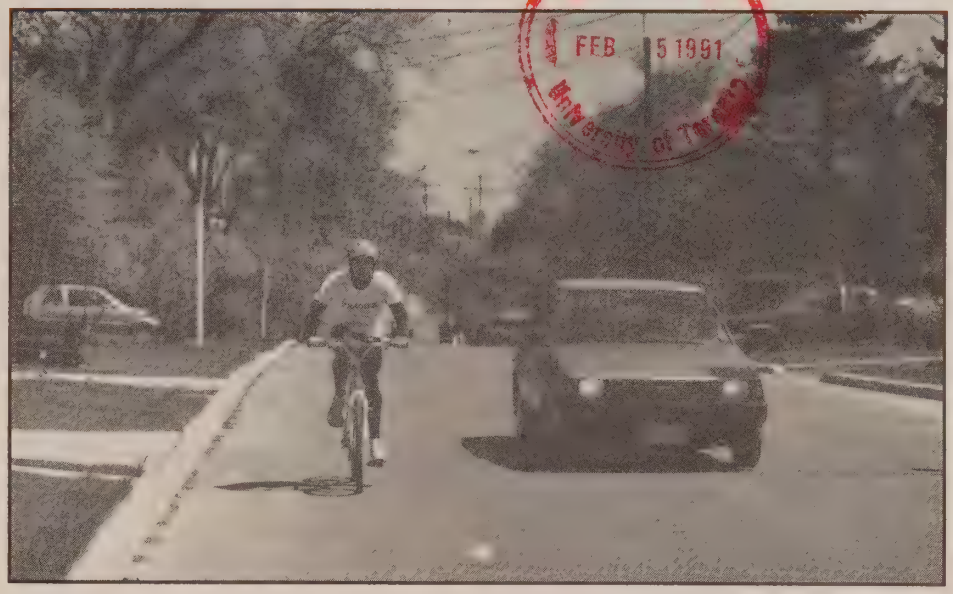
Updating Ontario's Bicycle Policy

The Ministry of Transportation of Ontario is conducting a review and update of its existing bicycle policy. This study will take a broad consultative approach and examine a range of issues that stand to influence the future of bicycling in Ontario.

The Ministry's existing policy was last reviewed in 1981 and resulted in a reconfirmation of Ministry support for the promotion of bicycle safety and education. The Ministry distributes bicycle safety promotion packages and materials to organizations such as police forces, retailers, and schools. Also, municipal bicycle facility planning is eligible for a 50% to 75% subsidy from the Ministry as part of a municipal planning study. Municipalities, however, are responsible for conducting bicycle planning, facility construction, and maintenance.

The Highway Traffic Act now establishes the cyclist as an equal and responsible roadway user. The purpose of the review is to determine if and how the Ministry can support bicycling as a viable means of transportation within a broad provincial context.

Objectives of the study include identifying components of the Ministry's present involvement in bicycle facilities; determining to what extent bicycling can be a part of a balanced transportation system; identifying omissions in the current policy; and incorporating a broad consultative mechanism. The factors to be examined include: demand trends, safety, costs, environmental factors, congestion, legislation



enforcement, energy, urban and inter-urban needs, bicycle registration, and theft. Other factors will be incorporated as identified during the study.

The Ministry is seeking background information that will be used to obtain a better understanding of the subject, the issues involved, and the policy options available. Specifically, the following items are requested from municipalities, agencies, interest groups, and individuals who wish to participate in the review:

- Bicycling demand or usage trends in your area;
- Bicycling safety or accident statistics and concerns;
- Existing policy or position on support for bicycle facilities;
- Bicycle facility costs from the past five years' expenditures and forecasts of costs for the next five years;
- Bicycle facility infrastructure within your community (e.g., km of bicycle trails, designation in mixed traffic routes, provisions for parking);
- Views on environmental factors, such as air pollution and energy consumption, that may influence biking;
- Other comments or information that you feel are of importance;
- Suggestions for other contacts.

Any data or information submitted on the above or other items related to cycling would be most appreciated. Please contact:

Mr. David Hunt
Municipal Transportation Policy Office
Ministry of Transportation
3rd Floor, West Tower
1201 Wilson Avenue
Downsview, Ontario
M3M 1J8
Tel: (416) 235-4174

■

To Hire or Not to Hire

Consultants have gained a good reputation based on cost effectiveness, efficient use of time, and expertise. These days, more Ontario municipalities are recognizing the advantages of consultants' services. However, there are many factors to be considered in making a choice of consultant. This article describes methods used by some Ontario municipalities for consultant selection, which perhaps other municipalities will find beneficial.

One city in northern Ontario divides most of its projects into two categories – small and large engineering projects. For small projects, the city appoints consultants directly and tries to spread work equitably. For large projects, such as road and sewer construction, written proposals are requested from three or four consultants, interviews are conducted, and a selection is made. Projects involving planning, architectural, and specialty studies undergo a similar process, but may vary depending on the size and nature of the project. Under the municipality's present consultant selection policy, any project for which the consultant's fees would be over $10,000 requires approval by City Council.

A western Ontario city approaches several prospective consultants based on their experience relating to the services required, previous involvement with the city, and office location. These consultants are asked to submit written proposals, which are evaluated only on technical merit, since cost estimates are submitted separately. When two or more proposals appear equally impressive, the top ranked consulting groups may be required to make a further presentation before a final decision is made. City Council must approve all appointments.

A municipality in eastern Ontario has developed these methods for consultant selection:

- By direct appointment: a consultant is chosen and given the project.
- The APEO (Association of Professional Engineers of Ontario) approach: several consultants are invited to submit proposals; the list is then shortened and the remaining contenders are interviewed before the final selection is made.
- Subsequent to an advertising campaign requesting either interest or a proposal, a number of submissions are received from which a short list is made and interviews are granted. A consultant is then chosen.
- A meeting, open to all consultants, is held, followed by consultant submissions and interviews, after which the final selection is made.

In some instances, after proposals have been received, the contract is awarded to the consultant with the "lowest cost proposal." As well, where applicable, two or more consultants are awarded the project and urged to combine their efforts.

A city in southwestern Ontario has a detailed method of appointing consulting engineers. Projects are either "special" projects or "normal" projects.

"Special" projects are those that require specialized expertise and experience that may not be available from the local consulting firms. Work of this type would generally involve a study rather than a construction job. In this case, terms of reference are prepared and submitted to consulting firms both in and out of the city who are deemed to have the expertise required. These consultants are asked to submit a proposal. The proposals are evaluated and a candidate is selected and recommended for the project. Projects that are largely financed by another public or government body are also considered to be in this category, but the selection procedures of the financial backer are used.

Those projects that do not meet the criteria of "special" projects are considered "normal" projects. For such projects the prospective consultant must be qualified, have adequate and competent staff resources to undertake the size and complexity of the project, and maintain a permanent office in the city. Also, the consultant must have demonstrated initiative, responsibility, and cooperation in carrying out past projects with the city and be familiar with city standards and with the immediate area of the present project.

The City Engineer establishes a file on each consultant's performance and conducts a formal evaluation upon completion of each assignment for the purpose of referral and recommendation. The City Engineer also conducts regular group meetings with consultants to improve communications and discuss items of mutual concern.

MTO Selection Procedures

The Ministry of Transportation classifies projects according to cost: up to $5000, between $5000 and $250,000, and greater than $250,000. For projects in the first category, a minimum of three consultants are considered; written proposals are not mandatory, but are encouraged. After some analysis and evaluation, a selection is made, which must be approved by the assistant deputy minister. For the middle price range projects, terms of reference are prepared and a minimum of three consulting firms are invited to submit proposals, which should include the following:

- description of firm
- staff assignment
- staff resumes
- company experience, including dates, on similar or related assignments
- proposed approach
- proposed schedule
- staff per diem rates
- estimated cost

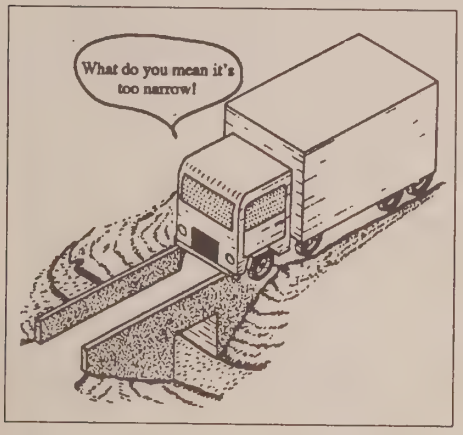
Continued on page 3...

Municipalities Save with Ontario Provincial Standards

Wondering how you can get more from your construction budget? Well, Ontario Provincial Standards (OPS) can help you.

The Ontario Provincial Standards are a set of specifications and drawings developed by the ministries of Transportation and the Environment and the Municipal Engineers Association for use by Ontario government ministries and regional municipalities.

The OPS specifications and drawings are reviewed and updated every five years and cover general conditions of contract in construction as well as material specifications and drawings in roads, barriers, drainage, electrical, and structural standards. They are intended to save municipalities time and effort in the preparation of Tender and Contract Documents and can improve the administration and cost-effectiveness of building roads, sewers, and water mains because they allow municipalities to assemble documents from a wide selection of standards.



What are other advantages of using OPS?

- They simplify and speed up design and contract preparation by providing a wide selection of standards from which the users can pick those that suit their requirements.
- They simplify the bidding process by providing a standard set of rules.
- They generate uniform contract interpretation. With commonly used contract documents, the contractor will not add in the guess factor to his bid and, as a result, you can expect fewer arguments on the job and fewer claims.
- They standardize construction documents. Uniformity leads to mass production which usually results in more cost-effective construction methods.

Each municipality is entitled to one complimentary set of Ontario Provincial Standard Manuals. They are divided into three main volumes: construction specifications, material specifications, and standard drawings. Also, a new User's Guide containing information on tenders will be available to OPS users in 1991.

OPS aims to fulfil municipal requirements and encourages comments and suggestions that may help them achieve this. If you would like more information, you can write, phone, or fax:

Ontario Provincial Standards
Ministry of Transportation
2nd Floor, West Building
1201 Wilson Avenue
Downsview, Ontario M3M 1J8
Telephone: (416) 235-3522
Fax: (416) 235-5314 ■

...Continued from page 2

The project managers assemble a committee comprising two or three experienced people to review the proposals and short list them to three. In some cases, the committee may ask the top three firms to present their proposals for evaluation. The following criteria may be included in the evaluation:

- qualifications and expertise of key personnel
- previous experience and performance
- availability of key personnel
- understanding of the objectives
- proposed schedule
- estimated cost

A recommendation to hire a selected consultant is then made to the Consultant Assignment Committee for its approval.

Assignments exceeding $250,000 are treated in the same way as the mid-range ones, except that approval to approach and hire the selected consultant must be obtained from Management Board via the Ministry's Consultant Assignment Committee.

In all cases, upon completion of the project, the consultant's performance is evaluated and a file is maintained for future reference.

Selecting the ideal candidate is essential for success in completing a project with efficiency. The procedures used by the Ministry and these municipalities have proven beneficial to them in the past and it is hoped that they will be valuable to other municipalities. ■

This article was written by Shawna Black and Lise Dupont.

Chairman's Message

Kees Schipper, MTEEAC Chairman

At this time of the year, we have left behind our summer vacations, our cottages, and our slower and easier living and returned to our jobs, our offices, and a more hectic lifestyle. During the summer, our important projects did not seem as important, meetings were held less frequently, and deadlines were not quite as rigid. Now that we are back at work, many assignments left on the back burner before we adopted the summer lifestyle are staring us in the face again. Just as we were getting used to it, someone rudely reminded us that this is the real world.

So it is with world energy supplies. The 1980s were a relatively relaxing time in the energy environment. There were no price bumps (prices actually decreased), no concerns about national energy supplies, and no new major federal or provincial energy programs or initiatives.

The recent turmoil in the Middle East (and I can only guess what has happened since the time of this writing) makes me think the vacation is over. It's back to the real world with increasing concerns over energy availability and cost. Our present and future problems may not be as dramatic as those of the early 1970s; nevertheless, the same underlying weaknesses in our national energy situation exist and our dependence on foreign sources for oil creates high uncertainty and volatility.

The committee has met (on a reduced schedule) during the summer and has focused on our priority projects for the next twelve months. In our view, we should concentrate on three main activities:

- A review of high-occupancy vehicle (HOV) priority measures such as HOV or bus only lanes and intersection priority measures;
- Car pooling either in geographic areas or at specific locations tied into HOV measures;
- A public education campaign regarding transportation energy management and efficiency.

The first two items have previously been examined and tried to some extent in North America. We feel the time is right to dust off previous studies and manuals, to review recent North American experience and to investigate how these concepts can be applied in Ontario during the 1990s.

The third project is something new. Transportation energy management involves many actors. In addition to government agencies and their technical staff, the public must play a major role, both in terms of acceptance and action, if transportation energy management is to be successful.

We will keep you advised of our progress on these and other efforts during the next twelve months. Meanwhile, if you have any comments on our upcoming works or any other energy related issue, we will of course be glad to receive them. ■

If you'd like to receive this newsletter, or know someone who would, please fill out this form and mail it to:

☐ New Request ☐ Change of address

Frank Cherutti
Executive Secretary
MTEEAC
3rd Floor, Central Building
1201 Wilson Avenue
Downsview, Ontario
M3M 1J8
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Transportation Technology and Energy Branch

PROTECTING OUR ENVIRONMENT
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ISSN 0843-8897

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Vol. 9
No. 4

Environmentally Friendly Fuel Choices

Growing concerns about the health and environmental effects of gasoline and diesel engine exhaust emissions, as well as the price of oil, are forcing suppliers and users to consider alternative fuels.

Gasoline and diesel, which have been the principal automotive fuels for decades, are no longer our only choice today. Propane and natural gas are both currently available alternative fuels, and methanol is just on the horizon. Others, such as hydrogen, solar power, and electricity, have potential as possible future transportation energy sources.

It is not obvious which alternative fuel is the most environmentally sound: all of them still produce various levels of harmful emissions – hydrocarbons, oxides of nitrogen, carbon dioxide, and carbon monoxide.

Hydrocarbons are partially responsible for ground-level ozone and react with oxides of nitrogen to form smog. The oxides of nitrogen contribute to the formation of acid rain. Carbon dioxide emissions contribute to the greenhouse effect, a major factor in global warming. Carbon monoxide, another exhaust emission, is an odourless, poisonous gas.

Diesel-fuelled engines produce fewer carbon monoxide and carbon dioxide emissions than gasoline. But the oxides of nitrogen in diesel engines,

One of the Toronto Transit Commission's natural gas buses – a product of Ontario's NG Bus Development Program

like the gasoline engines, have been recognized as an emission that must be controlled. Also, the particulates produced by diesel can be carcinogenic and a lung irritant. While diesel engines are cleaner today than in the past, the problem with particulate emissions remains. Most diesel engine manufacturers are engaged in intensive engine development programs to reduce particulate formation in their engines. Once this is done, controlling other emissions will be much easier.

Gasoline vehicles converted to propane or natural gas are currently the most viable clean-air alternatives to diesel fuel. Available domestically, and in abundant supply, these fuels' ability to meet government emissions standards, as well as Ontario's transportation needs, appears promising.

Propane

In a recent cross-Canada test, four 1990 Ford Tauruses were driven from Halifax to Vancouver. The cars were powered by gasoline, propane, natural gas, and M85 (85% methanol denatured with 15% gasoline). The propane vehicle's emissions of hydrocarbons, carbon monoxide, and oxides of nitrogen were all lower than the allowable levels set by government standards regulating these emissions.

An Ontario government program compared car and truck fleets running

(Continued on Page 2...)

(...Continued from page 1)

on propane with fleets running on gasoline. The propane-powered vehicles averaged 25% more fuel consumption than the gasoline-powered ones, but the propane fuel costs were 28% less. Other tests of propane-powered vehicles found increased fuel efficiency and driveability in low temperatures, especially for short trips.

The fact that carbon monoxide emissions are lower than those of gasoline makes propane ideal for vehicles operated in confined spaces, such as warehouses and storage buildings.

Propane changes from a gas to a liquid under low pressure and is stored in pressurized tanks as a liquid to maximize its on-board storage. Therefore, propane must be treated differently than other fuels and propane vehicles must be fuelled by a licensed attendant. Thus, there are no public self-serve propane fuelling stations.

Propane use may decrease maintenance costs, and is particularly suited to fleets with high fuel consumption costs. With approximately 1700 propane fuelling stations in Ontario, it is readily available to most consumers.

Natural Gas for Vehicles

Natural gas is an abundant Canadian resource and has the potential to meet a large portion of our transportation fuel requirements. In the cross-Canada test mentioned above, the non-methane hydrocarbons and carbon dioxide emissions were below the government standard, while oxides of nitrogen were just at the limit.

Lack of retail distribution prevents natural gas from being widely used as an automobile fuel by the general driving public. There are only about 40 public and 30 private stations in Ontario. But because companies and municipalities can install natural gas fuelling stations on their properties, natural gas has great potential for fleets. Currently, 24 000 Canadian light- and medium-duty road vehicles are powered by natural gas.

Recent advances in the design of small compressors will make it possible to refuel natural gas vehicles at home. These are currently being demonstrated in Ontario.

Some taxis and delivery vehicles are now using both gasoline and natural gas in a dual-fuel configuration, which allows them to run on either gasoline or natural gas at the flick of a switch.

Methanol

Studies and demonstrations of methanol have shown that it does have potential as an alternative fuel. The methanol exhaust emission levels of carbon dioxide, hydrocarbons, and oxides of nitrogen meet current government standards. One of the issues with methanol is that it produces formaldehyde, which is harmful to humans and animals. The use of specially formulated catalytic converters will address this issue.

Currently there are no methanol fuelling stations in Ontario. However, the construction of two fuelling stations in the province is being considered by the Canadian Oxygenated Fuel Association (COFA).

COFA has agreed to supply methanol at equivalent diesel or gasoline costs for specific demonstrations in which it is involved. Actual industrial grade methanol not manufactured expressly for fuel varies greatly in cost according to business conditions and is currently much more expensive than the cost of equivalent gasoline or diesel.

Some municipalities are considering introducing methanol-powered vehicles into their fleets. Of course, this will depend on the future availability of methanol.

In a demonstration project to determine the feasibility of methanol for future transit and general automotive use, Transit Windsor will soon add six methanol-powered buses to its fleet.

With gasoline at 50¢/litre, the current energy-equivalent prices for the alternative fuels are: diesel 38¢; propane 35¢; natural gas 30¢/litre equivalent. That is, the distance you can travel on 50¢ worth of gasoline will cost 38¢ with diesel, 35¢ with propane, and 30¢ with natural gas. (Note that engine efficiencies can also affect these costs.)

Alternative fuels such as propane, natural gas, and methanol offer the potential to meet the environmental challenges of the 1990s. From an overall perspective of energy security, environmental impact, economy, and operational flexibility, these fuels should be considered by municipalities for their fleets. ■

Do You Know?

Ontario's population is roughly nine and a half million people. How many of those people do you think are out driving on our province's roads?

a) More than six million
b) More than four million
c) More than two million

Answer in the next issue of *MTEEAC News*.

Re-Refined Oil for Municipal Fleets

"Reduce, Re-use, Recycle." Today's ubiquitous motto can apply to much more than bottles, cans, and paper. The use of re-refined oil is an example. Oil can get dirty and the additives lose their effectiveness, but the bulk of the oil components are unchanged and can be recycled.

Re-refining oil makes sense for several reasons. Using re-refined oil eases the growing demands on a rapidly decreasing, non-renewable resource. It also partially solves the problem of disposing of used oil.

Many consumers are a little wary of re-refined oil because of problems in the past associated with less-than-adequate refining processes. These problems have been overcome with newer processes, including thin-film and/or solvent extraction and hydro-treating. Re-refined oil is available at most outlets where oil is sold, and its price is equal to or less than virgin crude oil.

BresLube, a division of Safety-Kleen Canada Ltd., is the largest used oil collector and leading re-refinery in Ontario. BresLube picks up used oil from more than 15 000 industrial users, municipalities, car dealerships, and service stations and uses it to manufacture re-refined base oils for use in a variety of applications.

At the BresLube facility, water and fuels are removed from the oil by distillation. Then, under intense heat and vacuum, the oil undergoes vaporization. It is then separated into three viscosity grades. Finally, these three oil fractions are hydrotreated to improve colour, quality, and performance of the base oil. Hydrotreating removes undesirable components such as chlorine, sulfur, and nitrogen. This technology produces several products, such as base oils, process oils, and industrial and automotive lubricants.

There are very few other environmentally friendly alternatives for disposing of used oil. Burning oil causes acid rain; it is therefore very difficult to get a permit to burn oil in Ontario. Dumping oil in reservoirs or landfill sites is also illegal as it affects vegetation growth and contaminates drinking water. Using oil as a dust-control is also illegal. And, all of these are unnecessary wastes of a non-renewable natural resource.

The Ontario government now uses only re-refined oil in its fleets, and many police, fire, and ambulance fleets do the same. A few municipalities also use re-refined oil in their municipal works fleets.

Mr. Art Lake, General Superintendent of Services with the City of London, says London uses only re-refined oil in its fleets and gets excellent results. He feels re-refined oil is as good as, if not better than, oil from virgin crude.

The City of Kitchener has its used oil picked up by BresLube. Kitchener also purchases re-refined oil to use in its fleet of 108 buses. As more approved products become available, Kitchener will use only re-refined oil for its entire fleet.

Safety-Kleen's oil re-refinery at Breslau, Ontario.

The Ministry of the Environment endorses the use of re-refined oil as a waste management option. Some municipalities have also proposed blue-box collections of used oil from residents to prevent it making its way into the ecological system.

Providing collection of used oil for residents and switching to re-refined oil in fleets are two ways municipalities can make use of this environmentally acceptable product. As well as attaining good performance levels, re-refined oil can save a municipality as much as 20 percent when bought in bulk and 10 percent when purchased in drums.

It is clear that if re-refined oil were more widely used, the environment would benefit. Large-volume users, such as municipalities, other governments, and large industries, could be the leaders in the change to re-refined oil. Once its use in government and industry is firmly established, the general public's acceptance of the product will likely follow.

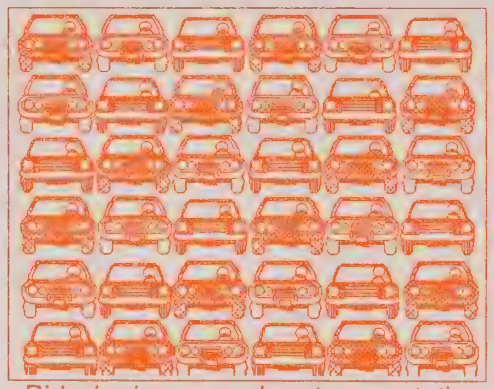
Products, such as Canada's Choice Engine Oil re-refined by BresLube, that are deemed to be a wise environmental choice are awarded the EcoLogo by the Canadian government.

Ridesharing Study Findings

Because ridesharing can reduce transportation energy consumption, road congestion, and air pollution by reducing the number of single-occupant vehicles on the road, the Ministry of Transportation and the Ministry of Energy recently commissioned a study on ridesharing in the Greater Toronto Area (GTA). The final report of the study is now complete.

The study was conducted by the IBI Group of Toronto. It concluded that, at least for now, employer-based programs have more chance of success in the GTA than an area-wide program. An employer-based program is one that is run by an employer, or several employers. An area-wide program, on the other hand, is organized around a central data-base registry serving all commuters in a certain geographical area. In employer-based programs, the participants have a common destination, which makes them easier to set up and helps ensure their success.

The study looked at existing ride-sharing programs in Canada and the U.S. and found several factors that have a bearing on their success and failure. For example, a large number of major employers supporting a ride-sharing program will produce more participants, thereby increasing the likelihood of successful matches. Also, limited transit service will increase the number of participants in a ridesharing program.



Ridesharing can reduce transportation energy consumption, road congestion, and air pollution by reducing the number of single-occupant vehicles on the road.

Another factor is the amount of control participants have; people are more likely to stay in their carpools if their input is sought about matters that affect the pool.

Apart from the obvious benefits, such as a reduction of fuel consumption, maintenance costs, auto emissions, and the number of vehicles required per household, there are other incentives that will encourage people to join a carpool. The Guaranteed Ride Home Program (GRHP) in Seattle is an example. Many people worry about finding themselves stranded without a ride in an emergency if they join a carpool. For a nominal fee of $5 a year, the GRHP allows participants 60 cumulative miles of taxi service each year. The GRHP organizers report that very few people take unfair advantage of the program.

Another key factor in ridesharing program success is advertising and promotion. Employers are likely to promote ridesharing if they are aware of the benefits to their companies. These are: reductions in staff tardiness, improved public perception of the firm, and improved employee relations. Employers can promote ridesharing through advertising in company newsletters and bulletin boards and by offering incentives such as preferred parking sites and parking rates for carpoolers.

Based on such factors as number of long-distance commuters, number of high profile employers willing to set up ridesharing programs, and limitations of transit service, the IBI Group recommended likely areas in the GTA for employer-based programs. These include the airport area, Meadowvale, and the Brampton industrial area.

The study predicts that once employer-based programs are operating in a certain area, an area-wide program will have a better chance of success.

If you'd like to receive this newsletter, or know someone who would, please fill out this form and mail it to:

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Frank Cherutti
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Transportation Technology and Energy Branch

Protecting our Environment
Ontario

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MTEAC NEWS

Fall 1991

MUNICIPAL TRANSPORTATION ENERGY AND EFFICIENCY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES AND THE PROVINCE OF ONTARIO

Vol. 10
No. 1

Rout and Seal Crack Treatment of Flexible Pavements

Rout and seal crack filling is a maintenance procedure for flexible pavements that prevents water from seeping down into the sub-base and causing damage to the pavement structure. If the underlying materials in the pavement retain water, the pavement structure will be damaged when the water freezes and thaws.

It is very important to the life cycle of the pavement that water is not allowed into the pavement structure. A case in point is sealing of transverse cracks caused by low-temperature shrinkage. If the transverse cracks are left untreated, they develop permanent deformation (also called stepping or cupping) at the crack. Cupping usually occurs when water, combined with a pumping action caused by traffic and salt, chips the asphalt cement from aggregate particles. The result is a detrimental reduction of thickness in the vicinity of transverse cracks and increased pavement roughness. Problems also arise when the pavement is resurfaced, since such large cracks usually cause stress to the new layers of pavement.

Many Ministry of Transportation (MTO) districts and most of the larger municipalities in Ontario use rout and seal crack filling on their pavements. Crack routing and sealing as a corrective maintenance procedure has been done in Ontario since 1978. The basic procedure involved in routing and sealing has remained the same, but the technology has improved over time.

If the underlying materials in the pavement retain water, the pavement structure will be damaged when the water freezes and thaws.

The Method

The first step in rout and seal crack filling is to rout the crack, following along the length of the entire crack. The usual size of the rout is 40 x 10 mm, but other configurations are also used. Routing is required to accommodate enough sealant to maintain a seal when the pavement contracts at low temperatures. Next, a compressed hot air lance is used to thoroughly clean and dry the rout. The sealant is then placed in the crack with either a hose and wand applicator, or poured with pouring cones. It is important that the sealant is poured immediately after the hot lance application, as the heat improves bonding.

Poor workmanship, including improper routing, cleaning, or filling of the cracks, can result in poor bonding between the sealant and crack. Poor bonds often result in sealant bond failure, making the crack filling process ineffective.

Pavement thickness is another factor to be considered. Pavements that are less than 90 mm thick, or less than 2 lifts, do not usually benefit from routing and sealing.

Sealants are made of hot-poured, rubberized asphalt concrete and have elastic properties that allow them to stretch and retract through different climatic changes. MTO has compiled a

(Continued on Page 2...)

(...Continued from page 1)

designated source list of brands of these sealants that have been tested and found to be satisfactory.

Five years ago, the Ministry of Transportation Research and Development Branch developed a computer program, ROuting and SEaling (ROSE), that aids the user in determining the cost effectiveness of routing and sealing. A standardized form is used to evaluate each section of highway, including age, pavement condition index (PCI), and the type, occurrence, and severity of cracks. This information is then entered into the program. ROSE determines if crack routing and sealing would be cost effective and/or necessary. It then ranks the sections entered on a scale of 0 - 10, prioritizing the sections that would benefit most from crack filling. The program runs on any PC compatible microcomputer. It is available to interested municipalities by contacting Jerry Hajek at (416) 235-4681.

Within MTO, each District Engineer decides if that particular district will use the rout and seal crack treatment, based on his or her experience, the funding available, and which maintenance procedures are considered to have the highest priority.

The cost of rout and seal crack filling is approximately $1 to $2 per linear metre. Some consider this to be quite expensive, while others feel that it is quite economical considering the expected extension of pavement life.

Another expense involved in routing and sealing is the equipment. Some MTO districts have their own equipment, but few municipalities do. It may not be economical for municipalities to purchase the necessary equipment; they could hire a contractor for the routing and sealing project.

City of Niagara

The City of Niagara has been using routing and sealing for over 10 years. Joe Gruninger, the Streets Superintendent, believes that routing and sealing cracks is a worthwhile procedure that will extend the pavement life. In Niagara, the general procedure is to put a new overlay on a road, and rout and seal the cracks two years later. Gruninger feels that routing and sealing carried out in this way will extend the pavement life from the usual eight years to 10 to 13 years.

Niagara hires contractors to do the routing and sealing, usually at a cost of $ .80 to $1.00 per linear metre. If the procedure is carried out properly, the sealant shouldn't come out of the rout. Gruninger has never had a problem with sealant bond failure. He does, however, concede that should the sealant come out of the crack, the pavement would be in worse shape than before, as the routing increases the size of the crack.

At times, crack filling is viewed as spending maintenance money to avoid large capital expenditures. For municipalities, funding is available for rout and seal crack filling through MTO. MTO funds all maintenance work for municipalities at subsidies of 50 to 80%, up to a pre-set dollar figure for each year.

Pros and Cons

The benefits of the rout and seal treatment for cracks are often debated. Because it is difficult to ascertain definite cost savings, the benefits are usually measured in terms of the extended pavement life cycle.

If properly administered, routing and sealing the crack can extend the pavement life, usually two to five years. Some research has also shown that pavements that have been treated with rout and seal crack filling respond better to future resurfacing.

Our investigations have shown that the general consensus is that the rout and seal treatment of pavements is cost effective if the pavements are treated within the first two to five years of the pavement life. If the pavement is treated within the first five years, many believe another treatment at approximately the eighth year will increase the extension of pavement life. On the subject of transverse cracks, once they become stepped and deteriorated, no amount of routing and sealing can fix them; the changes are irreversible.

Despite the faith that some people have in rout and seal crack filling, others believe that crack filling is an exercise in futility, as cracks in the pavement will return in three to five years, and therefore, there is little point in routing and sealing the cracks.

The purpose of routing and sealing is to keep water out of the pavement. To do this effectively, cracks may have to be routed and sealed more than once, making crack routing and sealing a constant procedure. If cracks are not filled when they appear, any work done could be construed as a waste of time.

Another point made by those against crack filling is that sand and dirt will fill the cracks naturally, making the time and money spent on crack sealing futile.

Routing and sealing involves tearing into the pavement, thus weakening the sub-base. If the sealant fails to bond with the sides of the crack or comes out of the crack, the pavement will be in poorer condition than before the treatment. Because of this, some feel it is not worth the risk to tamper with the pavement.

Another flaw in the rout and sealing process is that contractors are often hired to seal the cracks in a piece of highway by the linear metre. To increase their profit, some dishonest firms could rout and seal cracks unnecessarily.

Though many studies on routing and sealing have been conducted, the decision to rout and seal is still a subjective one. The decision should be based on the conditions specific to each municipality, including local experience, availability of reputable contractors, funding, and the condition of the pavements in that municipality. ■

Re-Refined Motor Oil

by Art Lake

The tax crunch is on in all municipalities, and this year more than ever before, municipal fleet operators will be looking for ways to cut costs. When you add the pressures from the environmentalists to reduce waste and recycle everything, life becomes even more interesting. Could there ever be a better time to seriously look at re-refined lubricants?

In the past, recycled products were looked at with some suspicion, but thanks to technological advances, this no longer has to be the case. In 1987, when the City of London opened tenders for lubricants, re-refined hydraulic oil came in at the lowest tender price, and met all specification requirements. After much soul searching, I recommended the use of re-refined hydraulic oil but did not accept re-refined motor oil at that time, even though it was also the lowest price offered.

At the time I had visions of disastrous engine problems. These fears later proved to be totally unfounded, but I did make up my mind to find out as much as I could about re-refined motor oil before our next lubricant tender call went out. Almost immediately I began to harass Performance Plus in Breslau because they were the closest re-refiner for test data, quality control information, laboratory engine test results, and anything else that might be educational. I had spent 15 1/2 years in the oil business, so I had a good idea of what type of information I wanted.

Art Lake has been named Fleet Manager of theYear. He is pictured here at the ceremony, with his daughter, Melora, and his son, Matthew. (See story, back page.)

Performance Plus came through with flying colours and staggered me with data, as well as two educational trips to the refinery. Notice I didn't say recycling facility, because it is a true refinery in every sense. The only difference is that carefully selected used oil is processed rather than the virgin crude oil that is used at conventional refineries. I watched the process from the arrival of the waste oil pickup tankers, to the finished water white base stock going into the holding tanks, and I was impressed. The laboratory facilities were modern and extensive to ensure continued high levels of quality.

Base stock samples were sent to one of the largest additive suppliers in the world, where additive packages were blended and engine tests conducted to assure compliance with all manufacturers' requirements. After reviewing the documents and pictures of disassembled test engine components very carefully, I became a believer in re-refined motor oils and lubricants to the point where we have just awarded a tender for re-refined lubricants for the next two-year period.

There are two main points to consider when looking at the use of re-refined lubricants:

1. If the product comes from a complete re-refiner, rather than a recycler only, you can use the product with full confidence after you examine the quality level of the product carefully, as I did, and know it will do the job.
2. The use of a re-refined product will immediately identify you as someone who cares about the environment and does not use unnecessary amounts of a non-renewable resource.

I hesitate to even mention the fact that you might even save some money on the initial price, but that's between you and your lubricant supplier.

It seems strange to pay someone to take away the contents of your waste oil tank only to buy it back again as a re-refined product, but let's agree on one thing – this is the right thing to do! ■

Do You Know?

What is the most common driver error in fatal collisions?

a) Speeding
b) Inattentiveness
c) Improper lane changes

Answer in the next issue of MTEEAC News.

Answer to last issue's question: Ontario has a driver population of more than six million people.

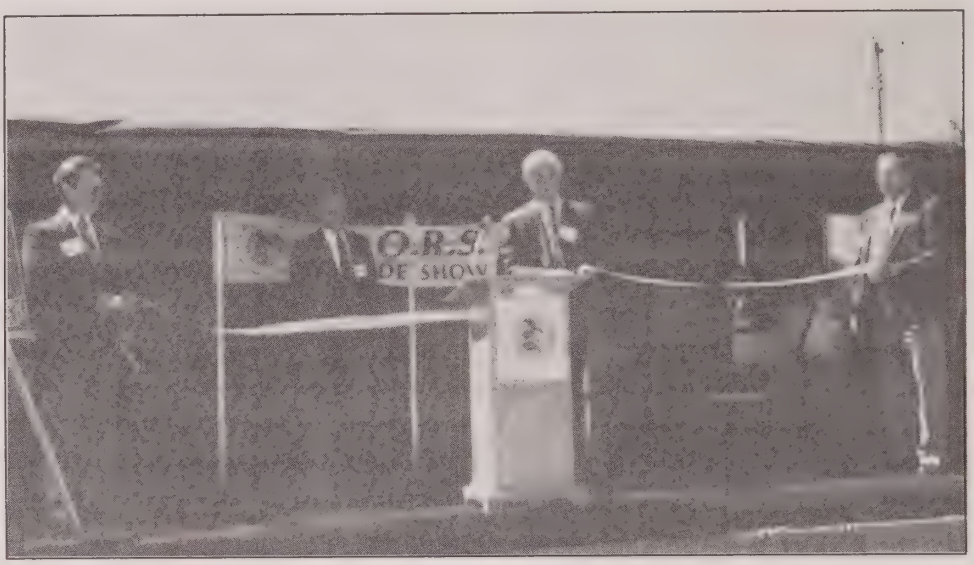
1991 Trade Show

The Bruce County Road Superintendents hosted the 1991 Trade Show on June 5th and 6th, at the Walkerton Arena and Fair Grounds.

Approximately 1500 people attended the Trade Show, wandering through the 230 indoor and outdoor displays. The winner of the best indoor display was Cox Signs from Walkerton, while the outdoor display winner was Cruthers Caterpillar.

The show had many impressive outdoor equipment demonstrations, but perhaps most interesting was the Dancing Bobcat demonstration.

Next year's show will be held in Petawawa, on June 3rd and 4th. Hope to see you there!



Rick Puccini, Regional Director, Southwestern Region, cutting the ribbon at the opening ceremonies.

Fleet Manager of the Year Named

Congratulations to Art Lake, this year's winner of the prestigious Volvo GM Heavy Truck Fleet Manager of the Year Award. The award recognizes Art's achievements during his career, which started in the early 1950s at Chrysler, and culminated as General Superintendent of Services for the City of London, Ontario, where he has worked since 1972.

In London, Art is responsible for a staff of 44 mechanics, welders, and others, two shops, over 600 pieces of equipment, and an annual budget of over $8 million. The envy of fleet managers everywhere is his propane powered light-duty fleet. Each light-duty vehicle operates on propane, which has saved London over $3/4 million since propane was implemented in 1984.

Art has been active in energy conservation for quite a number of years and served as a member of MTO's Trucksave Fleet Advisory Committee for five years. He is currently an executive member of the Municipal Transportation Energy and Efficiency Advisory Committee, where he has been instrumental in promoting preventative maintenance, alternative transportation fuels, and the use of re-refined oil. (See article on page 3.)

Your fellow MTEEAC Committee members congratulate you, Art!

If you'd like to receive this newsletter, or know someone who would, please fill out this form and mail it to:

☐ New Request ☐ Change of address

Frank Cherutti
Executive Secretary
MTEEAC
3rd Floor, Central Building
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The MTEEAC newsletter is a publication of the Ministry of Transportation, Transportation Energy and Productivity Office.

Ontario Ministry of Transportation

Transportation Technology and Energy Branch

Protecting our Environment Ontario

Except for Art Lake's article, this issue was written by Maureen Carlin.

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No. 2

Adopt A Highway: An Ontario Perspective

by Brian Gaston

Concern for the environment is affecting the policies and activities of public highway organizations across the continent. Highway departments, always conscious of the environment, are dedicating even more of their resources to environmental issues. But public resources, as always, are limited and concerned citizens are looking for ways they can help directly.

Local groups, such as school children and other organized groups of individuals, feel they can help by volunteering to clean up litter on highway and road rights-of-way. In response to these offers of help, many states in the U.S. have implemented a program called Adopt A Highway. The road authority enters into agreement with a volunteer group which agrees to clean up a section of highway. The response has been extremely positive in most states.

In North Carolina, for example, there are currently over 7,000 groups, comprised of an estimated 101,400 people, who clean up over 15,000 miles of state-maintained roads. The state estimates that over 512,000 bags of garbage were picked up last year.

The Challenges

The Adopt A Highway program offers several benefits. It provides an inexpensive and highly motivated labour pool that assists highway authorities to keep the highways litter-free. The participants can take pride in their work, and thus, have more respect for the roads they use every day. However, there are a number of challenges to be faced before a successful program can be implemented.

The top priority in a program of this type should be to ensure the health and safety of the volunteers and the travelling public.

The top priority in a program of this type should be to ensure the health and safety of the volunteers and the travelling public. The authority responsible for the road facility must monitor the volunteer activities to ensure that individuals' health and safety are not compromised.

The authority must also be prepared to provide some general training to ensure efficient, effective, and safe activity. Drop-off and pick-up of volunteers, the supply of garbage bags, proper traffic control set-up, and the sorting of recyclable materials are just some of the issues that must be resolved and communicated to volunteers.

In spite of the fact that most of the work will be done by volunteers, there will be some direct involvement by road authority staff. Typically, the authority will monitor a group's activities and may agree to pick up and dispose of the garbage. Authorities should also supply safety vests and garbage bags.

The concern for liability is very real and can be difficult to deal with. It may be

(Continued on page 2...)

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prudent for a volunteer group to purchase liability insurance for its activities. Not only will the insurance provide protection against mishaps with volunteers, but it will protect against third-party law suits. For example, if an accident occurs in the vicinity of litter pick-up activity, it is entirely possible that the individual(s) involved will be sued by the driver. In such a case, the group would have to defend itself in court and would be responsible for any fines unless it had applicable insurance.

The road authority must, therefore, be willing to expend some resources toward program development and administration.

Ontario's Involvement

The interest in Ontario in a similar Adopt A Highway program is growing rapidly. Ontario citizens travelling in the U.S. have experienced the success of American programs and want to follow their lead in this province.

The Ministry of Transportation (MTO) has organized trial projects to see what type of approach would work best in this country. The ministry's approach already differs from that of our southern neighbours in that MTO wants to try using volunteers for vegetation management activities, such as tree and flower planting, as well as litter pick-up. The plan is to evaluate the tests run in 1991 to set a new direction for 1992.

The Future

The decision to implement a volunteer program by a road authority must be based on both benefits and costs. Although there may be tremendous manual labour resources available to help with the environment, there are also costs related to program development, administration, and supervision.

Municipalities that would like to know more about MTO's tests and agreements should contact:

Brian Gaston,
Analysis Engineer
Maintenance Operations Office
2nd Floor, Central Building
Ministry of Transportation
1201 Wilson Avenue
Downsview, Ontario M3M 1J8
(416) 235-3664 ☐

New Summer Maintenance Training Video

I'd like to borrow an MTEEAC training video for a three-week, free-of-charge loan.

☐ Winter Control Operations ☐ Summer Maintenance (Available in March 1992)

Send to:
Frank Cherutti
Executive Secretary
MTEEAC
3rd Floor, Central Building
1201 Wilson Avenue
Downsview, Ontario
M3M 1J8
(416) 235-5030

Name: _____

Municipality: _____

Address: _____

_____

_____

Phone: _____

A summer maintenance video is set for a March 1992 release. A winter control operations video is available as well. Interested municipalities or companies can reserve copies at no cost by completing the form to the left. When available, videos will be loaned for a three-week period to allow time for borrowers to make copies for future viewing.

Equipment Engineering Services

by Hugh Blaine

The Equipment Engineering Office of the Ministry of Transportation (MTO) develops specifications for the purchase of equipment by Ontario municipalities and for equipment required by the ministry. The specifications are written to ensure that equipment is suitably efficient and effective at the lowest cost, taking initial purchase price, operating costs, and durability into consideration.

Equipment Engineering also co-ordinates the operation of the ministry fleet, administers a computerized fleet information system, and is responsible for centralized equipment acquisition.

The Equipment Engineering Office is comprised of two sections: Fleet Management and New Equipment.

Fleet Management Section

Under the direction of the Head, Fleet Management, the section develops operating and maintenance procedures for ministry vehicles and equipment. This section contacts government agencies such as the ministries of Labour and the Environment, and MTO's Health and Safety Office and Environmental Engineering Office to ensure compliance with current legislation. Fleet Management has an operator-instructor in each district who trains staff in the operation and maintenance of equipment. Fleet Management's senior operator-instructor guides the district operator-instructors who teach, test, and license MTO operators.

MTO updates mechanics on new equipment through the Distant Education Program. Working in conjunction with an Ontario community college, the program incorporates correspondence lessons, practical projects at district locations, and classroom sessions to keep employees up to date.

The Equipment Engineering Office was a pioneer in the use of a computerized fleet management system. The ministry is now switching from the mainframe application to a microcomputer system based on the previously developed Municipal Fleet Management Information System (MFMIS). MFMIS was developed by MTEAC in the mid-'80s to simplify the acquisition, storage, and retreival of information on municipal fleet operations.

All MTO districts are now in the process of implementing this system. Fleet Managegement also calculates rental rates for MTO subsidies used by municipalities to distribute repair costs to vehicle users. For more information on MFMIS, please see the Sept. 1985, vol. 4, no. 3 issue of *MTEAC News*.

Units such as this bridge inspection truck are available for rent from the Equipment Engineering Office.

New Equipment Section

This section prepares specifications used to buy equipment based on information from district staff, district fleet management information systems, long-term tests, and other large fleets.

Equipment evaluations are under way on components to improve productivity and durability and to reduce fuel consumption. As such, the specifications group operates an electric van, monitors the operation costs of propane, natural gas, and diesel powered vehicles, and will evaluate methanol powered vehicles when they become available.

At the request of the Equipment Engineering Office, the Vehicle Technology Office of the Transportation Technology and Energy Branch recently completed power consumption and load evaluation tests of 9- and 14-foot snowplows. The results, when reviewed by Equipment Engineering staff, will provide better understanding of the power requirements and the effects of certain loads on the operating systems, and in turn, will help them spec snowplows more effectively.

MTO has been gradually switching to single rather than double person operation of winged snowplows. This switch led to an evaluation of new controls and an improvement to operator safety. Improvements include: new mirrors and mirror locations, new lights and light locations, power windows, windshield defrosting equipment, heated windshield wiper blades, headlight wiper systems, better seating, reduced noise levels, more precise controls, and ergonomically correct control locations.

The New Equipment Inspector inspects new equipment and co-ordinates inspection by district staff when equipment is delivered to one of the MTO districts. This individual saves his or her salary many times over by spotting problems and unsafe situations

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and arranging to have problems corrected. The inspector also identifies equipment with which MTO operators may not be familiar so the training group can provide instruction when required.

The New Equipment section also manufactures specialized highway maintenance and research equipment when it is not available from commercial sources. For example, large, high production highway line painting machines and weed control sprayers are being constructed. This group has built equipment to retrieve cones at highway maintenance sites, test the skid resistance of pavement, test the strength of bridge components, and to apply road salt at a uniform rate.

The New Equipment section also supplies vehicles to the ministry's Head Office groups. Municipalities and firms working for municipalities can rent these units from MTO when the equipment is not available from commercial sources. This equipment includes tractor trailers for load testing of structures and bridge inspection trucks used to position engineers anywhere beneath a structure to inspect its condition. One of these units is equipped with a thirty-foot work platform which enables crews to repair the underside of structures.

Additional information is available from the following staff: **Les Dawley**, Manager, (416) 235-3682; **Bill Zin**, Fleet Management, (416) 235-3678; **Hugh Blaine**, Head, New Equipment Section, (416) 235-3679. ☐

MTEEAC's New Focus

The state of the environment is on the minds of many people these days. This is one reason that MTEEAC has expanded its mandate to include environmental issues. The committee will continue to advise municipalities of energy efficiency measures that are available for implementation, but now, the new MTEEAC will also deal with the effects of energy use on the environment and the resulting changes in the transportation sector.

Currently, MTEEAC consists of representatives from the Ministry of Transportation, the Ministry of Energy, and various municipalities. However, MTEEAC hopes to rejuvenate the committee and use task forces more often to accomplish its objectives. The use of task forces will utilize expertise from external sources and will help to give MTEEAC initiatives greater exposure.

Some of the new issues that will be dealt with include: the use of alternative fuels, the use of re-refined oil, the promotion of recycled tires, and the reduction of hazardous emissions.

If you would like more information on MTEEAC's new mandate or have any comments about *MTEEAC News*, please call the Executive Secretary of MTEEAC, Frank Cherutti, at (416) 235-5030. ☐

Do You Know?

When do you think most pedestrians are injured?

a) When they are crossing an intersection that has no stop sign or traffic light.

b) When they run onto the road without looking first.

c) When they are crossing an intersection when they have the right-of-way.

Answer in the next issue of MTEEAC News.

Answer to last issue's question: Driving too quickly – either over the speed limit or too fast for the road and weather conditions – is the most common driver error in fatal collisions.

If you'd like to receive this newsletter, or know someone who would, please fill out this form and mail it to:

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Ontario Ministry of Transportation
Transportation Technology and Energy Branch

Protecting our Environment. Ontario

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MTEAC NEWS

Spring 1992

MUNICIPAL TRANSPORTATION ENERGY AND EFFICIENCY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES AND THE PROVINCE OF ONTARIO

Vol. 10 No. 3

Mississauga Transit's $20 Million Plan

The Mississauga Transit Commission has built an outdoor storage facility for its buses as a demonstration project. This facility will allow buses to be stored outside utilizing a hot water system.

Outdoor storage facilities have the potential to save Mississauga more than $20 million during the next ten years by circulating water through a heat exchanger to maintain a constant temperature on the buses. Drivers and passengers will be able to ride in a warm, comfortable bus from the very beginning of the trip.

When drivers begin or end their shifts, they will connect or disconnect buses to a heating line that will pump a hot-water solution through the vehicles' heat exchangers and fluid through the radiator system. The connection includes compressed air, which is used to keep the bus suspension system pressurized.

A row of overhead canopies houses the heating lines, the compressed air, and electrical services for the buses and also protects operators from inclement weather. The system will automatically turn on when the temperature falls below 10°C, keeping the buses and their engines at 15° to 18°C. Buses will start easily, use less fuel, and spend less time idling during warm-up, creating less pollution.

Another advantage of this system is that the buses remain in a natural, outdoor environment rather than a heated garage. In artificial heating environments such as garages, there is an increased risk of corrosion from salt on the vehicles, since salt corrodes material more quickly in a warm environment.

Mississauga Transit's outdoor storage facility. A row of overhead canopies houses the heating lines, the compressed air, and electrical services for the buses and also protects operators from inclement weather.

A small, 22 000 square foot building is part of the system. It contains a fuelling station, a bus wash area, seven maintenance bays, mechanics' facilities, operators' check-in area, and a lounge.

This procedure was pioneered in Sweden, where it has been used for more than 25 years. Ed Dowling, General Manager of Mississauga Transit, as well as MTO and TTC personnel, initially had some reservations about the system. However, after seeing the facility operating in Sweden, their doubts subsided. Mississauga Transit approached MTO for funding approval to build a demonstration facility and monitor its performance. Because the climate in Sweden is similar to Canada's, there is no reason why the concept should not be successful here.

Few problems are expected with the new facility, since the system is not new, but is an existing European concept being adapted to North America. In fact, Mississauga Transit has enhanced the European procedure, perhaps making the system even better: various design changes in the heating system and site construction have

(Continued on Page 4...)

Vehicle Emissions Testing

If you've visited the Ministry of Transportation in Downsview lately, you may have wondered what that white metal box is at the Keele Street entrance alongside a yellow MTO van. Well, it's a remote sensing system that is being evaluated at the ministry by the Vehicle Technology Office.

The box, called the Stedman unit, takes an instantaneous snapshot of a car's exhaust emissions by reading an infrared beam directed across the road as the vehicle crosses it. A computer in the van controls the unit and records the carbon dioxide (CO_2), carbon monoxide (CO), and hydrocarbon (HC) emissions of the vehicle, all without interference or inconvenience to drivers. At the same time, the video camera relays a still photo of the vehicle's licence plate to a screen in the control van. This image is then recorded on a VCR so that the vehicle can be later identified from the vehicle registration files maintained by MTO.

The project is being carried out by the Transportation Technology and Energy Branch in association with MTO's Compliance Branch and the Ministry of the Environment as part of a joint effort to reduce vehicle emissions and improve air quality. The concept was developed by Professor Donald Stedman of the University of Denver and the MTO unit is one of the few prototypes so far made. David Elliott of the Vehicle Technology Office first saw the system demonstrated at a Clean Air Week in Toronto in April 1990, purchased the Downsview unit from the University of Denver, and has been overseeing its testing.

Extensive calibration tests have confirmed that the system does indeed give a satisfactory indication of actual emissions as the vehicle passes. The next task is to see whether this instant measurement can be related to other tests, particularly the Transport Canada standard emission test with which all new vehicles must comply.

New South Wales Minister for the Environment, Tim Moore and Philip Reed, the minister's chief of staff, visited MTO in January to see the Stedman unit in operation. Shown here with the Stedman unit are, left to right, Philip Reed, Milt Harmelink, TT&E Director, Tim Moore, Ovi Colavincenzo, Manager of Vehicle Technology Office, and David Elliott.

The unit has been field tested since October 1991 and it is now being operated twice weekly at the MTO Downsview site. This is an ideal test location because readings from the same MTO and employee vehicles are being taken over a period of time. By checking readings against each other, one can get a good indication of the reliability of the system. At the same time, selected employees are being invited to submit their vehicles for detailed testing. This will enable a correlation to be made between the single pass-by measurements and the actual vehicle emissions performance as tested on the MTO chassis dynamometer. When we have an adequate degree of satisfaction that the equipment can reliably indicate vehicle emissions performances, consideration will be given to operating this equipment at various locations around Ontario.

One of the main reasons for measuring vehicle emissions on the road is that the output of in-use vehicles is not accurately known. Emission standards apply to new vehicles only and only a very few are ever tested in Canada. Performance is known to deteriorate with use and the manufacturer only guarantees the emission control system for 80 000 km. There are computer models that attempt to predict the emissions output of vehicle fleets of various ages and types and thus their contribution to air pollution; however, their accuracy has been questioned. Meanwhile, important decisions need to be made concerning, for example, highway construction and extensions, which are the direct responsibility of the ministry. Accurate information is needed to predict the effect on air quality, and the need for revised vehicle standards and whether or not to take remedial action with the existing fleets, such as instituting regular inspection and maintenance programs as has been done in many other jurisdictions. It has already been observed that 10% of the vehicles produce 40% of the carbon monoxide.

It is hoped that the Stedman system, when operated regularly in the field, can be used to pinpoint these excessive emitters and thus avoid inconveniencing the vast majority of owners whose vehicles are up to standard.

For more information on this topic, please contact David Elliott at (416)

Snowplow Tests at Centralia

The Vehicle Technology Office of MTO's Transportation Technology and Energy Branch recently completed a comprehensive vehicle test program on Ministry of Transportation (MTO) snowplows.

At the request of the Equipment Engineering Office (which develops the specifications for snowplow purchasing by Ontario municipalities), power consumption and load evaluation tests were performed on a five- and six-ton International dump truck and nine- and fourteen-foot snowplows.

The tests were designed to reflect actual on-road power/fuel and force requirements and to examine any problems that arise during plowing.

The vehicles were instrumented to measure horsepower at the driveshaft, forces where the plow is mounted on the truck, and various dynamic properties of the system. Most of the instrumentation was original to the ministry, designed and perfected in-house and used for the first time on the test vehicles.

The test program involved driving the plow into an obstruction at different points to measure the forces experienced by a plow hitting a curb or train track; and driving on dry, wet, and snow-covered roads with the plow both lowered and raised to measure horsepower, fuel consumption, and forces on the chassis. A high winging test was done to measure the forces on the wing and wing struts. Hill climbing tests were done to measure power consumption and force requirements on the components. A comparison test was also done to compare a plow with a special low-friction coating to one without.

The overall test phase took approximately three years of winter tests and two summer sessions to gather all of the data. All testing was done at MTO's Commercial Vehicle Test Facility in Centralia and on surrounding area roads.

Results of the impact test revealed that the adjustment of the plow trip mechanism directly influenced the magnitude and nature of the impact loads transmitted to the frame of the truck: poorly or incorrectly adjusted trip mechanisms caused larger, uncontrolled loads to be transmitted to the chassis.

As expected, plow and shaft horsepower increased with vehicle speed and snow depth and density. The six-ton vehicle had the lower specific fuel consumption at higher horsepower demands.

In the case of the fourteen-foot plow, a clear relationship between plow angle (hence, swath width) and power consumption was evident in these tests. The lateral thrust on the plows did not appear to be significant, usually below 230 kg. Once plowing began, the loads on the plows appeared to remain uniform and concentrated.

Overall, the six-ton truck required more horsepower to operate but its specific fuel consumption was less than the five-ton.

This information, when reviewed by the Equipment Engineering staff who specify snowplows for purchase by municipalities, should provide better understanding of the power requirements associated with daily operation of the two trucks and two plows tested and help them to gauge the effect of certain loads on the operating systems of the vehicle. This in turn, will help them to spec snowplows more effectively.

For more information, please call Walter Mercer at (416) 235-5006.

(...Continued from page 1)

been made to the Swedish bus operation. Information concerning these changes will be documented and made available as a result of this demonstration project. There will be great monetary savings, as only 2200 cubic feet of bus space need be heated, rather than 5000 cubic feet of parking space in a garage.

The first of Mississauga Transit's facilities opened in Malton on October 25th, 1991. The new facility went through testing for the remainder of 1991 and is now fully operational. Mississauga Council recommended that five facilities be built over the next 10 to 15 years with each facility holding 80 to 100 buses. The second facility is planned for Meadowvale in 1993, subject to Ministry of Transportation (MTO) funding approval.

The cost to build the outdoor demonstration facility was approximately $9.36 million. The same size indoor facility would cost $12 million. Both of these figures include the $3.5 million needed to purchase the six acres of land required to house the facility. Ontario Bus Industries has retrofitted 40 Mississauga Transit vehicles with on-board heating systems at a cost of $5000 to $8000 per bus. All new buses ordered from OBI will come with the needed equipment.

The Malton outdoor storage facility program is being subsidized by MTO. The Swedish components for the outdoor facility are being subsidized under MTO's demonstration program, while the building is being subsidized under the regular capital program.

The outdoor storage concept looks very promising, but may not be applied as widely in Metro Toronto because it would not make sense to tear down an existing indoor facility to build an outdoor one.

According to Chief General Manager Al Leach, the Toronto Transit Commission is studying whether it can save money on a proposed $25 million transit terminal using the outdoor terminal. Kingston is also tendering for a new garage for its transit vehicles, and is considering an outdoor storage facility as a viable option for the proposed garage.

Watch for information on the success of Mississauga's new outdoor transit storage facility – this could be the wave of the future. For more information on this topic, contact Ed Dowling of Mississauga Transit at (416) 279-5900 ext. 266 or Peter Coghill of MTO at (416) 235-4033. ■

Did You Know?

Answer to last issue's question, "When do you think most pedestrians are injured?": Most pedestrians are injured while crossing the road correctly, at an intersection and when they have the right-of-way. However, most are *killed* when they cross an intersection that has no stop sign or traffic light.

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Summer 1992

MUNICIPAL TRANSPORTATION ENERGY AND EFFICIENCY ADVISORY COMMITTEE
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Vol. 10 No. 4

Scrap Tires: An Old Favourite with a New Twist

Remember dashing across the grass or the playground, racing for the chance to ride the old scrap tire dangling from a tree? This is an image we are all familiar with, but it's not a solution for the billions of scrap tires flooding North America. Ontario generates approximately 7 to 8 million scrap tires every year. The problem is that tires, unlike many materials, are not biodegradable and exist for hundreds of years without deteriorating.

The old scrap tire hanging from a tree is not a solution for the billions of scrap tires flooding North America. Shown here is Adrienne Harris, co-op student, University of Waterloo.

Currently most scrap tires are collected and used for landfill, or stockpiled. Governments store scrap tires in garages in the hopes that new technology and markets will develop to consume them. However, new markets develop slowly and storage areas, if not well maintained, can provide a breeding ground for insects and vermin.

Landfilling is the most common method of scrap tire disposal. The difficulty with landfill sites is that the tires take up a disproportionate amount of space and float to the top of the site. Landfills also develop areas that collect and trap dangerous gases and toxic liquids.

Stockpiling has both environmental and financial disadvantages. The Hagersville tire fire of 1990 is a powerful example of stockpiles as a public liability. As a result of this disaster, new fire safety regulations are in place and most dealers will not accept scrap tires because the cost of complying with the new regulations is too high. Dealers now charge $2 to $5 to dispose of scrap tires. The increased dealers' rates and the imposition of the $5 tire tax in January 1989 by the Ontario government have resulted in an increase in the illegal disposal of tires along country roads and in parking lots. This has become a serious problem for municipalities.

During the past decade, numerous committees, task forces, companies, and governments have addressed this important environmental issue, attempting to reduce the number of scrap tires entering the waste stream. The solutions they have found are rooted in the three Rs of waste management: reduce, reuse, recycle.

Reduce

Developments in tire manufacturing technology have extended the life span of tires from approximately 25 000 km in 1960 to about 80 000 km today. These advancements have helped extend the time before scrap tires enter the waste stream. Technological developments have also increased the reliability and safety of tires.

Reuse

Whole tires are used in marine applications as floating breakwaters or wave control. Scrap tires are also used in artificial reefs; each reef has the potential to consume approximately two million tires. Another use of scrap tires is in highway abutments.

(Continued on Page 2...)

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Used tire markets offer another answer to the scrap tire problem. Used tires eliminate the cost of additional processing, making tires available to the owner at a lower price than new tires. However, only good tires with a sufficiently deep tread can be resold. Although reusing tires will not substantially decrease the number of scrap tires, reselling tires will reduce the demand for new tires.

Retreading tires, applying a new tread to the good casing of a worn tire, is another possible solution. Retreads are used on local and long distance buses, school buses and light and medium trucks, including Ontario government and municipal vehicles. Currently, few passenger tires are retreaded in Ontario. However, properly retreaded passenger tires are just as safe as new tires. Safety is only compromised when drivers fail to maintain their tires correctly. Truck tires are easier to retread because they are designed to be retreaded and the casings are much heavier and can withstand more wear than passenger tires.

The price of truck retreads is approximately 20 to 50 percent of the cost of new tires. Using retreads also offers significant environmental savings. For example, producing one truck tire uses 22 gallons of crude oil, while retreads use only seven gallons. Under the supervision of Stan Alter, Senior Marketing Officer for MTO's Government Fleet Administration Office, all Ontario government ministries are currently using retreads in their fleets.

Recycle

Studies reveal that the public is biased against products made with recycled tires. However, items made with tire material may be less expensive and of a higher quality than those made with pure plastic. For example, Viceroy Rubber and Plastics Ltd. makes fluorescent highway construction cones and other commercial products from reclaimed rubber. MTO purchased 5000 of these cones. Another company, National Rubber, received a $9 million grant from the province to explore the potential uses of recycled tires. The existence of companies that explore uses for scrap tires is contingent on provincial government financial support.

One of the many scrap tire piles in Ontario.

The Ministry of Transportation is currently attempting to combine rubber and plastic to create plastic "lumber" for sign and traffic posts. Recycled rubber in noise and traffic barriers is another avenue that is being explored by the ministry. MTO, with Domal Envirotech Inc. and the City of Etobicoke, is involved in a trial project examining the feasibility of using recycled tires for manhole collars and risers.

MTO is also examining the potential of combining crumb rubber with asphalt to form a binding material called rubber-modified asphalt. The ministry is observing the outcomes of dry and wet processes. In the dry mix, the aggregate is replaced by two to three percent rubber. However, this mix has proven inferior. The weight of traffic causes the rubber pieces to loosen and move to the top of the pavement. The wet mix offers greater possibilities. This process involves combining hot asphalt with fine crumb rubber. Although wet mix has more potential than the dry, it contains only about 0.5 percent recycled rubber.

Several policy options are currently being presented by committees and organizations that deal with reducing the quantity of waste tires. Some policies require that tires be shredded before being dumped in landfill sites. Other policies encourage the provision of economic incentives for recycling tires by direct payments to processors. Regulations prevent shipping to areas with low landfill tipping fees and require regular surveillance of illegal disposal areas. Finally, government funding of product and market development and government purchase of products that contain recycled materials is vital.

The number of scrap tires entering the waste stream is a significant environmental issue that can no longer be ignored. It is essential that provincial governments, industry, and municipalities make every effort to reduce tire waste. One of the most effective ways municipalities can battle this problem is to use retreaded tires. The next issue of *MTEEAC News* will highlight MTO's comprehensive retread program.

For more information on scrap tire management, please contact:
Dr. A. Coomarasamy
Research Scientist, R & D Branch
Ministry of Transportation
3rd Floor, Central Building
1201 Wilson Avenue
Downsview, Ontario M3M 1J8
(416) 235-4678. ■

High Occupancy Vehicle Network Study Completed

Co-sponsored by Metropolitan Toronto, the Ministry of Transportation, and the Ministry of Energy, the High Occupancy Vehicle (HOV) network study attempts to address the problem of increasing rush-hour highway congestion. HOVs are buses, taxis, and cars or vans occupied by three or more people. The study examines the need, feasibility, and effects of preferential treatment for high occupancy vehicles in Metro Toronto.

The report concludes that a HOV network in Metro Toronto is warranted, feasible, and should be established. It also makes several key recommendations directed toward ensuring the ultimate effectiveness and success of a HOV network in Toronto.

The recommendations detail the HOV network plan, operations, priority and incentive programs, and administration. Of the five network concepts evaluated, the grid concept is the most viable alternative for Metropolitan Toronto. This concept mirrors the grid network already present in Toronto. The grid network provides access to all of Toronto's major centres and growth areas, and can be implemented in the short term to support growth. In addition, this concept supports existing bus and carpool use in Toronto, and extends future rail transit programs.

The study suggests that HOV lanes operate during peak periods: from 7 to 10 A.M. weekday mornings and 3 to 7 P.M. weekday evenings. Adequate financial and public resources are necessary to provide effective police enforcement of HOV lanes. A pilot project may be undertaken to report the feasibility of a peer enforcement program through phone-in reports of violations. A surveillance program should be established to monitor the performance, usage, and the continuing benefits of the network.

A recently implemented HOV lane on Dundas Street in Toronto.

To gain the acceptance and support of the public, HOV priority and incentive programs must be organized. HOV lanes are only one aspect of alleviating traffic congestion. Therefore, the plan suggests a comprehensive HOV-oriented mobility program. This program will promote ridematch services, corporate vanpooling programs, preferential HOV treatment in parking lots, marketing and public education efforts, and express transit services.

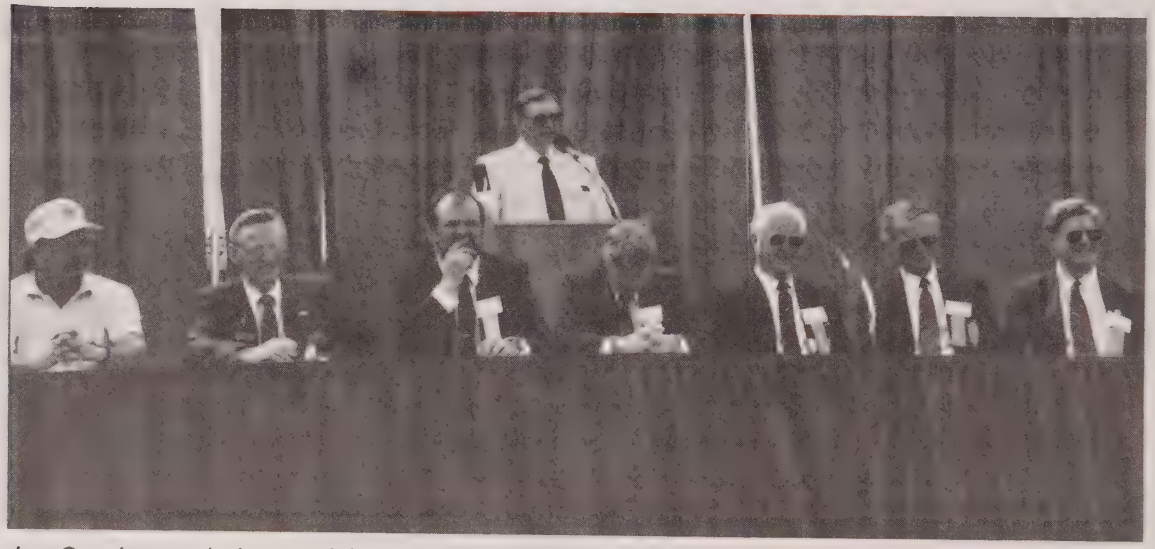
The study suggests defining an administrative body as the primary instrument in HOV network planning and implementation. Because the effectiveness of the network depends to a significant degree on generating HOV use from commuters, HOV network planning should occur in coordination with surrounding municipalities. Some municipalities adjacent to Toronto have taken initiatives to implement HOV networks; the report recommends that efforts by these regions to extend and support Metro's HOV network should be encouraged.

The costs of HOV networks include the capital cost of signing and pavement marking for existing lanes, and the cost of construction for road widening. Further costs include marketing, ridesharing programs, and police enforcement.

The benefits of HOV networks are improved transit operating efficiency, decreased levels of congestion, lower energy costs and levels of pollution, and a reduced average travel time of about five to ten minutes. The HOV network will utilize existing lanes more efficiently. The advantage of the proposed plan is that it can be easily and readily implemented in stages to match available financial resources.

The ultimate success of high occupancy vehicle networks lies in public acceptance and the most effective advertisement for HOV networks is the presence of efficient, convenient, and well-used HOV lanes. ■

Trade Show 1992



Joe Gruninger, chairman of the AORS Trade Show Committee, addresses visitors at the 7th annual Ontario Road Superintendents' Trade Show.

The Renfrew County Road Superintendents hosted the 1992 Trade Show on June 3rd and 4th at the Petawawa Civic Centre.

Approximately 1200 people visited the 126 indoor and outdoor exhibits. Representatives from MTEEAC distributed information on energy and fuel efficiency for municipalities. SALTEX Canada was recognized for the best indoor display and Gardner-Denver for the best outdoor display.

Several draws were sponsored by the Renfrew County Road Superintendents. The winner of the first prize trip to Las Vegas was Tom Malone. Second prize winner George Potter received a white water rafting weekend for two. Third prize, a bungee jump, was won by Richard Dunlop.

The Renfrew County Road Superintendents should be congratulated on a successful and well-organized trade show. Next year's show will be held in Listowel, on June 2nd and 3rd. Hope to see you there! ■

This issue was written by Adrienne Harris.

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Fall 1992 Vol. 11 No. 1

Retreading Is Recycling

In our Summer 1992 issue, we promised to inform you on the Ministry of Transportation's tire retread program.

In an effort to reduce the number of scrap tires entering the waste stream, the Ministry of Transportation of Ontario (MTO) is aggressively pursuing a comprehensive tire retreading program.

"Retreading is the highest form of recycling," says Stan Alter, senior marketing officer for MTO's Fleet Administration Office.

Scrap tires at Bancroft District, ready to be retreaded.

Retreading tires involves applying a new tread to the good casing of a worn tire.

In the fall of 1990, MTO's Bancroft District agreed to participate in a pilot project evaluating the effectiveness of retreaded tires on 89 units of its heavy equipment and light trucks. The vehicles with retreaded tires were evaluated under normal operating conditions. Their performance was found to be totally satisfactory.

In addition, instead of spending $24,000 on new tires, the Bancroft garage had its worn tires recapped at a cost of $12,000. The Bancroft experience clearly shows that the tires not only perform satisfactorily, but also that they are economically attractive.

As a result of this pilot project, the Bancroft garage will retread its used tires wherever possible, instead of buying new ones. Similarly, all provincial ministries can slash tire bills by an average of 50 percent by retreading their worn tires, says Mr. Alter.

Tires can be retreaded two or three times if the casing is in good condition. Heavy equipment tire casings can be used up to five times because of their strength and precise maintenance procedures. This is a substantial saving; new heavy equipment tires cost approximately $500 each.

Not only are retreaded tires financially attractive, they are environmentally advantageous. For example, producing one truck tire uses 100 litres of crude oil, while retreading uses only 30 litres. Retreading conserves oil, a non-renewable resource, and saves scarce landfill space. Thousands of tires will be recycled this year because of retreading.

After the success of the Bancroft project, Mr. Alter began touring the province promoting the benefits of retreaded tires. Currently, every MTO district uses retreads. Retreads are also used on local and long distance buses and school

(continued on page 2...)

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buses. "We haven't had one failure," says Mr. Alter. Other provincial ministries – Agriculture and Food, Correctional Services, Environment, and Natural Resources – are now following MTO's move to retreaded tires.

"Retreads have developed a bad reputation over the years because of poor quality technology and workmanship," reports the senior marketing officer. Organizations and institutions interested in using retreads must shop comparatively for the most advanced technology and quality work; accepting anything less than top value invites problems. When deciding which company to employ, MTO compared technology as well as product.

Many people have a negative impression of the quality of retreads because of the rubber pieces they see on roadsides and highways. These pieces of scrap tire are caused by underinflating and overloading tires. And 90 percent of the tire pieces are from the original structure of the tire. Properly retreaded tires are just as safe as new ones. Safety is only compromised when drivers fail to maintain their tires correctly, whether they are new tires or retreads.

The ministry is presently in Phase II of its retread program, which involves establishing policies and procedures. Its mandate is to eliminate all of its scrap tires and to buy as few new tires as possible.

Although Ontario has made significant strides in retreading heavy road machinery and light truck tires, the retread industry for passenger tires is practically non-existent. MTO recently organized demonstrations in Toronto, Port Hope, and Kingston, examining the performance of retreaded passenger tires on half-ton pick-up trucks. Mr. Alter reports that the first six months of this project have been a success.

A retreaded scrap tire still in use from the original pilot project in Bancroft District.

Yet, the market is still not enthusiastic about passenger retreads. Representatives from retread firms believe that retreaded passenger tires will be unable to compete with the lower priced types of new tires. The Ontario Scrap Tire Task Force, of which Mr. Alter is a member, has made several recommendations to deal with this problem. For example, the task force suggests that the province consider granting low-interest loans to firms expanding into passenger tire retreading and provide rebates on retreaded passenger tires.

The committee also made recommendations encouraging municipalities to adopt retread programs. The task force suggests that, in order for municipalities to receive funding for transit programs, they should use retreaded tires on their buses. Thunder Bay, Kitchener, Welland, St. Catharines, and Ottawa are currently using retreaded bus tires. The committee further recommends that municipalities include retreading in their purchasing policies.

On May 8, 1992, Mr. Alter spoke to 25 fleet representatives from the Municipality of Metropolitan Toronto on the advantages of retreads. He expects to hear from these representatives shortly and will offer them support in implementing a successful retread program.

When asked for a final message to leave municipalities, Mr. Alter said, "If you want to hand a better world to your children and your children's children, start by retreading all your tires."

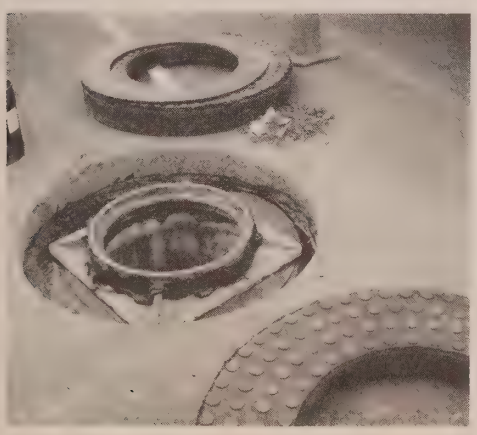
For more information on this topic, please contact:

Mr. Stan Alter
Senior Marketing Officer
Government Fleet Administration Office
1201 Wilson Avenue
Central Building, 1st Floor, Rm 135
Downsview, Ontario
M3M 1J8
(416) 235-4940 ■

Dress Up Your Manhole – Put a Collar on It

A new and innovative product developed by Domal Envirotech Inc., in cooperation with the Ministry of Transportation of Ontario and the Ministry of the Environment, may provide a solution to the growing problem of municipal scrap tire disposal. Using the rubber from recycled tires, Domal has created rubber transition collars and adjustment rings for maintenance holes to help reduce pavement deterioration caused by freeze and thaw cycles and heavy traffic. This product has the potential to decrease Ontario's tire waste by 70 - 80 percent.

Not only are the rubber collars and adjustment rings environmentally beneficial, they are also cost-effective: the adjustment rings are priced at approximately $18-20 and the collars at $250-300. Fred Svirklys, president of Domal Envirotech Inc., says, "There are no guarantees with conventional maintenance hole repair. You can't recapture the original integrity: if you repair the maintenance hole once, you will have to go back every year. But the rubber collars and adjustment rings have a lifespan of at least 15 years."



The rubber absorbs the impact of traffic vibrations and frost heaving without jeopardizing the pavement's strength.

In addition to cost benefits, this process offers significant time savings. The entire process takes approximately one hour, compared to conventional methods that may disrupt traffic for an entire day. To repair a maintenance hole, a special piece of equipment called a RoadBadger Manhole Master cuts a hole in the asphalt around the manhole. The existing asphalt surrounding the metal frame is removed, as well as any deteriorated concrete and bricks under the frame. Rubber adjustment units are placed under the frame raising it to the desired elevation and the asphalt is replaced with the rubber collar. All of these components are then secured with a special sealant.

The rubber absorbs the impact of traffic vibrations and frost heaving without jeopardizing the pavement's strength. The rubber also counteracts soil movement, which results in pavement deterioration. This product has another advantage: the rubber collars and adjustment rings are completely reusable and recyclable. Approximately 100 maintenance holes have been repaired with this process in the Greater Toronto Area.

The Ministry of the Environment and private investors will provide the funding for Domal's first manufacturing facility, which will probably be located in the City of Etobicoke. Etobicoke was also selected as the first municipality in North America to participate in a test project evaluating the effectiveness of the rubber collars and adjustment rings in actual road conditions. The Ministry of the Environment absorbed the cost of the rubber unit. The municipality was only responsible for labour costs.

The process takes one hour, compared to conventional methods that may disrupt traffic for an entire day.

The project's success thus far has sparked interest in Europe and the United States. Mr. Svirklys has been travelling across the U.S. promoting the benefits of using rubber collars and adjustment rings in maintenance hole repair. "Catch basin transition collars and rubber adjustment rings are in the development stages," says Mr. Svirklys.

Tom Ellerbusch, director of Road and Structures Engineering for the City of Etobicoke, says, "The application of the transition collars and adjustment rings benefits our road network by minimizing reconstruction, rehabilitation, and maintenance costs and meets with the Ontario government's program to reduce, reuse, and recycle."

For further information on this topic, please contact:
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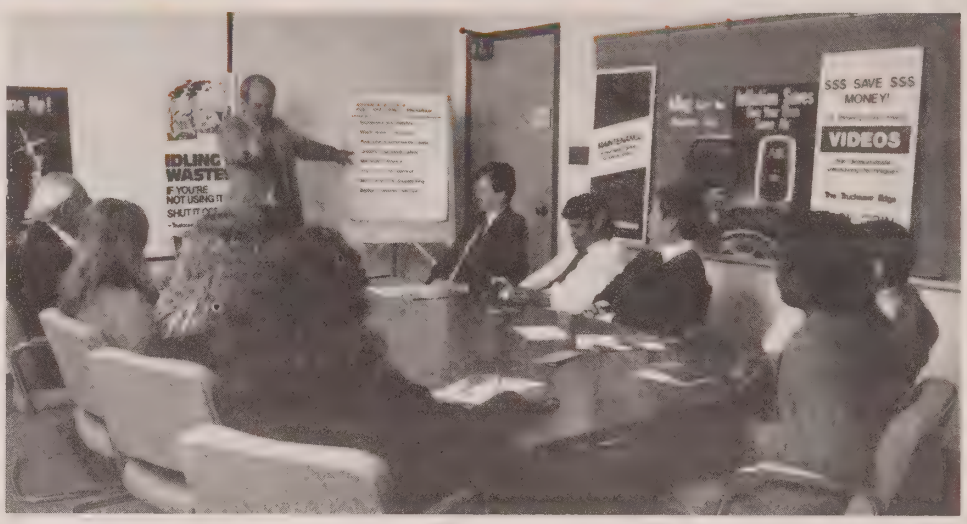
Fleet Management Seminars

The Municipal Transportation Energy and Efficiency Advisory Committee (MTEEAC) is sponsoring a series of one-day Fleet Management Seminars that will be presented to Ontario municipalities. The seminars will be held at the following locations in the fall of 1992: London, Nov 10; Hamilton, Nov 12; and Mississauga, Nov 26. Seminars are also planned for Ottawa, Kingston, Thunder Bay, and Sudbury in the spring of 1993.



The purpose of the Fleet Management Seminars is to improve fleet management operations and maintenance by lowering operating and administrative costs and increasing productivity. The seminars also focus on methods of increasing fuel efficiency and reducing emissions which ultimately help to improve the environment.

Each seminar is divided into six sessions:

Session I introduces the concept of fleet management for increased efficiency and provides a lead-in to fuel conservation techniques.

Session II describes fleet management information systems in terms of the objectives, capabilities, and use of these systems in the daily operation of fleets.

Session III describes vehicle efficiency measures, focusing on specifications and maintenance programs.

Session IV describes methods of improving vehicle productivity through optimizing vehicle use and introducing driver training programs.

Session V introduces the use of alternative transportation fuels in a municipal setting. This session focuses on government policy, conversion costs, safety, and tax incentives. The objectives of fleet management, barriers to record keeping, and approaches to the automation of record keeping will also be discussed.

Session VI describes a typical implementation sequence for a vehicle's conversion to propane.

The seminars are aimed at municipal fleet managers and operators, municipal utility agencies, and selected government fleet managers. Presentations will be made by provincial and municipal staff who have extensive and practical knowledge in the area of fleet administration and operations. An informal atmosphere with active participation from those in attendance will be encouraged.

Attendance is by invitation only. The invitations will be sent out as soon as all the final arrangements are completed. ■

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MTEAC NEWS

MUNICIPAL TRANSPORTATION ENERGY AND EFFICIENCY ADVISORY COMMITTEE
A JOINT TECHNICAL COMMITTEE OF MUNICIPALITIES AND THE PROVINCE OF ONTARIO

Winter 1993 Vol. 11 No. 2

Road Repair Impacts on Transportation

"Short-term pain for long-term gain" is the view often taken toward road reconstruction. These "pains," however, may not be as short-term as they appear. Many municipalities have become concerned over the possible negative environmental, economic, and social impacts that road construction may have. Their transportation planning and research staffs have analyzed the extent and consequences of these impacts. Their findings, published in various reports and articles, may be broadly summarized as follows.

Many municipalities have become concerned over the possible negative environmental, economic, and social impacts of road reconstruction.

Environmental Impacts

Although road reconstruction benefits drivers, its effects on the environment can be detrimental. Many types of pollution occur when construction takes place, the most prevalent being air and water pollution. Idling cars caught in congested traffic emit nitrogen oxides, hydrocarbons, and carbon dioxide. These pollutants are big contributors to smog and global warming – significant environmental problems.

Other environmental damage is caused by spills and the disposal of construction waste. Both may severely damage natural habitats and pollute local waters. In some cases these natural areas may not only be harmed, but may be permanently destroyed.

Economic Impacts

Road reconstruction carries not only an environmental cost, but a significant localized economic cost as well. Businesses, individuals, and municipalities may all be financially affected.

For businesses located in a construction zone, road reconstruction may lead to a drop in sales as customers may be inclined to shop elsewhere to avoid the dust, noise, and congestion. Congestion may also cause delays in the delivery of inventory. These delays add significantly to the cost of transportation, while for businesses using "just-in-time" delivery schedules, they can have more serious financial implications through production disruption. Congestion is also a problem for truckers carrying priority loads or perishable items as delays could result in a huge financial loss. All of these issues can lead to a severe drop in commercial income.

The public faces increased costs under these circumstances as well. Idling wastes oil, gas, and time.

Municipalities also face additional costs when undertaking road reconstruction. Due to new environmental demands, municipalities must take additional "preservational" steps when

(Continued on Page 2...)

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making repairs, which can create additional cost. Expenses can also increase if there are conflicts between construction and the local utility lines (hydro, electricity, sewer, telephone). Discovery of unknown or mislocated utilities can cause construction delays.

Social Impacts

The community may also be inconvenienced by road reconstruction. If the reconstruction is taking place near residential areas, people must deal with the noise, dirt, and inaccessibility of their homes. If the reconstruction is taking place near public property, community institutions, or government services, the general public may be inconvenienced by the temporary inaccessibility of these buildings.

If there are unclear instructional signs and unusual road conditions in reconstruction zones, accidents can occur in these areas. Drivers may have to react quickly to unexpected road changes. This not only puts drivers at a safety risk, but can cause stress as well. These unusual road conditions also cause traffic delays, affecting personal and professional schedules.

Solutions

Many municipalities have developed various approaches to minimize the adverse environmental, economic, and social impacts of road reconstruction. They have found that much can be done through proper planning, scheduling, and effective use of communications. What particular approach works best depends on the circumstances of the reconstruction site.

Planning, scheduling, and the use of various communications tools are, of course, standard components in the design of any road reconstruction plan. The following considerations can provide an additional checklist to evaluate how well these components can also address the concerns introduced by the environmental, economic, and social impacts.

Pre-planning the details of construction projects will quicken the reconstruction process and reduce the duration of impacts. Pre-planning can also provide for other transportation options during the reconstruction, thus reducing the severity of the impacts.

In some areas, planning takes the form of a "Traffic Management Plan," which analyzes the possible problems that could be encountered on a particular project, and proposes solutions or approaches for dealing with them. Such a plan may involve ordering supplies ahead of time, or purchasing prefabricated material to speed up the reconstruction. It should also analyze transportation requirements and outline alternative traffic routes and accesses that would be used during the reconstruction. Such alternatives should be designed with the objective of providing the best traffic flows and accesses, not only to keep traffic from interfering with the construction activities. Such an approach may even require some improvements and alterations of alternative routes to ensure that these will be able to accommodate the increased traffic volume they will receive.

Scheduling is another important element that is used to reduce reconstruction impacts. Wherever possible, road reconstruction should be synchronized with work on utilities that involve excavation or other forms of road closures. Doing everything at once prevents constant traffic disruption, but this can be done only if the planning and scheduling of the projects are done in consultation with the utility companies.

The impacts on transportation can also be minimized by scheduling the construction work for times when the least number of people are affected by it – during evening and night hours instead of rush hours, for instance. Construction can be speeded up by scheduling shift work to take full advantage of off-peak traffic periods – or even to work "around the clock."

It is recognized that off-peak and accelerated work schedules can be costly. The added cost should, however, be weighed against the environmental, economic, and social benefits accrued by the reduced disruption of the transportation system.

Scheduling may also be constrained by factors such as safety and local anti-noise by-laws. Nevertheless, as scheduling offers significant opportunities for reducing the adverse impacts of construction, it should be pursued as far as possible within the constraints of any particular project.

Communication is another essential element in strategies to reduce reconstruction problems. Advance notices about the nature, purpose, and timing of the project should be given to all transportation users in the area. Clear descriptions of alternative routing and accesses should be similarly conveyed. Such information gives drivers and transportation users an opportunity to adjust their routes, schedules, and travel times.

Traffic flows during the reconstruction period can also be reduced by providing information about and promoting the use of alternative modes: transit, carpooling, bicycling, and walking. This can be done with posters, pamphlets, press releases, and radio messages.

Road reconstruction is a reality as Ontario's road system needs continuous rehabilitation and maintenance. There are, however, ways of reducing the environmental, economic, and social "pains" of the process. It simply requires that these three elements be factored into, and be given adequate priority in the standard planning process. ■

Etobicoke's NGV Success Story

The City of Etobicoke was one of Ontario's first cities to get serious about alternative fuels (ATFs). The first ATF vehicles went into service for demonstration and evaluation in 1984 and the city hasn't looked back since. Today, Etobicoke has 40 natural gas vehicles (NGVs) operating in its fleet and this number will grow to 60 within the year. The success of the program is due to a council that is committed to ATFs and to David Jones, Supervisor of Energy and Building Systems, who has shown great enthusiasm and innovation in promoting the program in the city and in ensuring its success.

Each vehicle is hooked up to its own Fuelmaker Vehicle Refuelling Appliance (VRA) and the vehicles are refuelled while parked overnight.

In early years, there were some problems. First, the estimated cost savings were based on 90% natural gas utilization. In practice, this was closer to 60%. Second, the fast-fill compressor that was installed in the city's Bering Avenue Works Yard had numerous breakdowns, causing lower NGV usage, compounded by the necessity to fuel at retail stations at higher costs. At one point, the compressor was out of service for several months. And finally, there was the cost of lost productivity due to drivers having to travel out of the way to fuel their vehicles.

David came up with several novel solutions to these problems. First, to increase NGV utilization, several vehicles were converted to single fuel for evaluation. This proved successful and all future conversions will be single fuel. These vehicles, which perform better than dual fuel, are provided with a minimum of 200 litres (water volume) of NGV storage, equivalent to about 55 litres (12 gallons) of gasoline. This minimum volume matches the daily duty cycle of the vehicles and ensures 100% NGV utilization. To increase the reliability of the NGV compressor, David came up with a second innovative and cost-effective solution. After considerable review, it was decided that an overnight slow-fill station could work in the Kipling Yard. A slow-fill compressor is cheaper to purchase and maintain and uses less electricity to compress the gas.

David tendered the purchase of a slow-fill compressor spec'd to fuel 22 vehicles. The low tender came in from Fuelmaker Corporation based on installing 22 Vehicle Refuelling Appliances (VRAs), more commonly known as home compressors. This bid came in lower than a single large compressor of the same capacity. A great advantage of this approach is the service contract. If a VRA fails, Fuelmaker Corporation can replace the unit on two hours' notice – a big improvement over the repair time delays for the Bering Yard compressor station.

Fuel cost is also a major benefit. The city negotiated a direct purchase contract for natural gas for all its city energy needs. At the bulk purchase price, natural gas costs about 20 cents per litre gasoline equivalent. This works out to an average per-vehicle saving of $1400 per year for a payback period of 4.9 years for the total capital cost of the program. Etobicoke keeps vehicles on average for six years so those last months of service are all profit. When the vehicles are retired, the NGV kits and tanks are removed for installation in the replacement vehicle, and the VRAs will be paid for. The retired vehicles are auctioned as gasoline vehicles and bring in prices similar to vehicles that were not converted.

Etobicoke is pleased with the cost savings and the environmental benefits of NGV. The city plans to convert all light-duty vehicles ranging from pickups to 10 000 kg GVW dump trucks. Etobicoke parks its vehicles at several other yards throughout the city and with the advent of the home compressor, may someday have NGV available at all yards.

For more information, contact David Jones at (416) 394-8513.

MTEEAC Fleet Managers' Seminars

Last issue (Fall 1992, Vol. 11, No. 1), we introduced a new series of seminars for municipal fleet managers and administrators. On November 26, 1992, MTEEAC sponsored the first of these seminars, held in Toronto. Thirty-five attendees from municipalities and utilities in southern Ontario came to hear speakers on a variety of topics. The success of this first seminar suggests that the next seminars, scheduled for London, Ottawa, Kingston, Thunder Bay, and Sudbury, will be equally popular.

The day began with opening comments by Frank Cherutti, former Executive Secretary of MTEEAC. This was followed by a talk on preventive maintenance by Art Lake of the City of London. Other topics included vehicle spec'ing presented by Hugh Blaine of MTO's Equipment Engineering Office and an overview of alternative fuels by Craig Willis of MTO's Transportation Technology and Energy Branch.

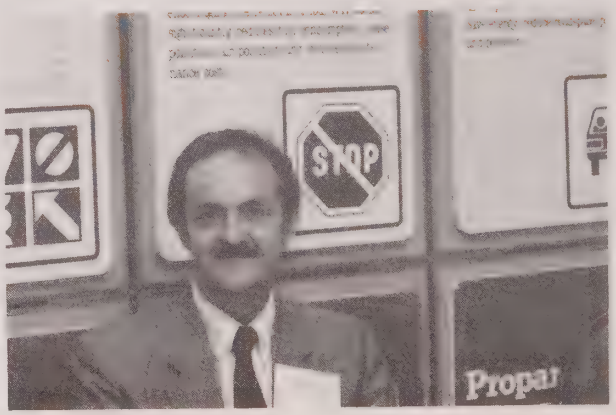
The afternoon session started with a talk on fleet management systems by Craig Willis, followed by a session on operations training by Phil Rajnauth of Equipment Engineering Office.

The final presentation of the day was made by Richard Auzins from MTO's Drivers and Vehicles Office who discussed new transportation regulations in Ontario as a result of the adoption under the Highway Traffic Act of Canada's National Safety Code for Commercial Vehicles. Judging by the number and variety of questions on the code, this is a topical issue.

The next two seminars are tentatively scheduled for April 20 in Ottawa and April 21 in Kingston, with the same topics to be covered. The municipalities in eastern Ontario will receive invitations in the mail. An RSVP is requested and a fee of $25 is charged for rental of the room and lunch. Seminars in the remaining cities will be scheduled throughout the year.

For further information on the upcoming seminars, call MTEEAC at (416) 235-5037.

Best wishes to past MTEEAC member, Frank Cherutti, as he begins his retirement. Frank was with the Ministry of Transportation for 35 years and spent 12 of those years working on MTEEAC as the executive secretary. Frank's accomplishments include co-ordinating the development of the TEAM manuals, municipal seminars, HOV studies, and maintenance videos. Congratulations, Frank!



This issue was written by Cheri Chevalier.

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The MTEEAC newsletter is a publication of the Ministry of Transportation, Transportation Energy and Productivity Office.

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FUEL$AVER & MTEEAC NEWS

A Special Joint Ridesharing Issue

ation Transportation Technology and Energy Branch

Summer 1993

RIDESHARING - A HISTORICAL VIEW

This combined issue of Fuel$aver and MTEEAC News is dedicated to the topic of ridesharing with the purpose of renewing interest in ridesharing and identifying some opportunities for municipalities, private employers, and individual commuters to contribute toward a more effective, efficient, and environmentally friendly travel mode.

If recent trends continue, this will become an everyday picture. Ridesharing is one solution to increasing vehicle occupancy, leading to fewer vehicles, less congestion, and cleaner air.

Ridesharing is not new. Someone speculated that it probably began, somewhat romantically, in the late 1800s with the advent of the "bicycle built for two." Whatever its beginning, ridesharing has grown in popularity over the years. The number of carpools peaked in the 1970s and 1980s: a result of public concerns regarding the cost of gasoline and vehicle operation, the possibility of energy shortages, and a growing interest in environmental issues. Various marketing efforts and employer-sponsored programs also supported ridesharing.

Unfortunately, ridesharing's popularity has been on the decline in recent years. Daily auto trips per person have escalated across the Greater Toronto Area (GTA). The daily auto trip rate increased from 1.72 trips per person in 1986 to 1.92 in 1991. The GTA population grew 12.5% in this period but trips increased by 21%. In terms of travel mode, per capita auto trips increased, while transit use dropped slightly. Average vehicle occupancy for work trips in some corridors is 1.2. In other words, about four out of five cars are single-occupant vehicles during the rush hours.

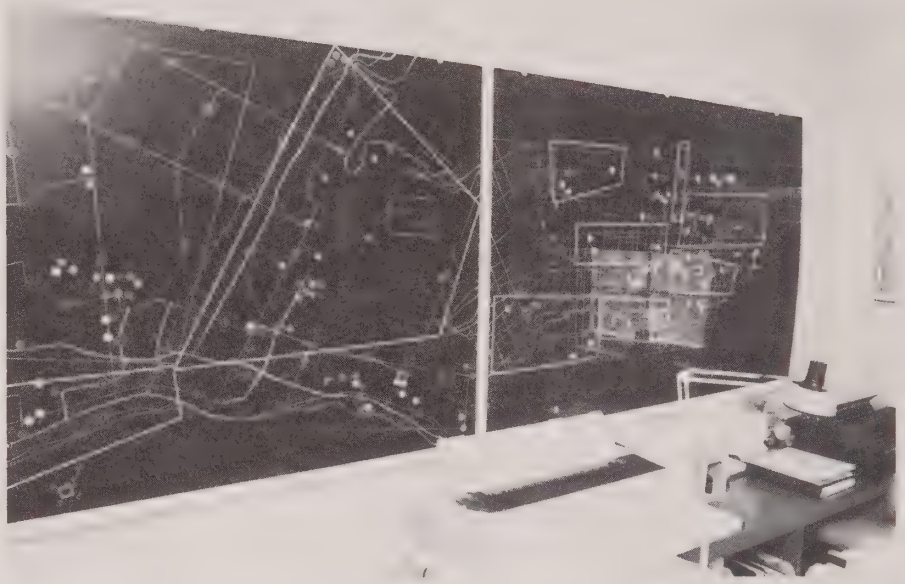
The figures show a decline in ridesharing and a shift to single occupant vehicles, rather than a shift to transit. This decline is not unique to the GTA, but is occurring throughout North America. For example, recent surveys of travel trends throughout North Carolina showed a 32% drop in multiple passenger vehicles in the 1980s, during which overall commuting increased by more than 24%. Again, the shift was to single occupant vehicles and not to transit.

This trend needs to change. It is leading to more and more congestion, parking problems in downtown areas, accidents, and air pollution, not to mention losses in revenue to transit properties and increased demands for construction capital for road infrastructure. Transportation planners have been aware of this problem for some time and the province, municipalities, institutions, and private companies have several initiatives under way.

It is hoped that this newsletter can help change the trend by discussing ridesharing and giving examples of several successful operations undertaken by both public and private sectors to alleviate our transportation and environmental problems.

A Healthy Approach to Ridesharing

What began as a parking problem for Sunnybrook Health Science Centre, situated on busy Bayview Avenue in North York, has turned into an innovative program incorporating a number of features. Sunnybrook, with 4000 regular and part time employees, along with 1500-2000 patients and more than 1000 daily patient visitors, was facing serious parking problems compounded by shrinking budgets and limited space for expansion. Sunnybrook had to come up with some ideas to reduce the demand for parking, particularly by its employees.



Sunnybrook's Control Centre. Each Share-A-Ride participant is posted on a map that gives a visual picture to assist in computer matching of riders.

The job of solving the parking problem was assigned to Kathy Webster, General Manager, Commercial Operations, with strong endorsement and support of the hospital's senior management. Kathy recognized early in the assignment that a Transportation Management System (TMS) approach to the entire issue of travel was needed. The TMS approach required an employer-sponsored ridesharing program as the key. She also recognized that ridesharing could not be achieved without some employee incentives.

Kathy's first step was to survey the employees to determine interest in a ridesharing program. A local consulting firm conducted the survey and determined that about 7% of employees would be interested. However, 400 people responded to an initial ridesharing program, about 10% of Sunnybrook's employees. The initial contact formed 43 carpools of 2 to 5 persons eliminating over 100 cars from the lot. Carpooling numbers are expected to double by the end of 1993.

There are a number of incentives in place to carpool. First, parking fees in employee lots doubled over an 18-month period during which time the Share-A-Ride program was initiated. There are only 1900 spaces for 4000 employees. After accounting for shift work, there is such a shortage of parking that about 400 employees are on a waiting list for parking permits. These employees, if they drive to work, must park in the patient/visitor lots at twice the daily charge. Employees who share a ride go to the top of the waiting list and get a further 20% reduction in employee parking rates.

Another employee incentive followed negotiations with senior management. Employees are allowed 15 minutes of flexibility to start and end the day, if necessary, in order to carpool.

Matching Software

Kathy looked at available rideshare matching packages and could not find one that was ideal. The reason was that she wanted eventually to integrate the carpooling database with the parking lot database to eliminate the need to police the lots and to simplify and automate the billing for parking. She had to develop matching software specifically for Sunnybrook to allow this future integration. This software was written in DATAEASE DBMS language.

One of the problems with matching riders is that it is usually done on a straight line basis from home to work and is usually done by matching postal codes. This method quite often misses matches where travel corridors do not follow a straight line. This problem was overcome by constructing a large map. The map pinpointed, with coloured stickers, the location of each carpooler (see photograph). If the computer cannot find a match, the map is used to supplement the search process. This system has proved to be a useful auxilliary tool in the matching program.

The other measures in Sunnybrook's TSM approach were equally innovative. First, Kathy contacted the Toronto Transit Commission (TTC) which was in the process of adjusting its routes and schedules in the Bayview Avenue corridor. Sunnybrook's employee records showed a large number of employees living north and east of the Centre and these people would be affected by the proposed changes in service. Working with the TTC ensured a high level of service in this corridor. Second, subsequent to talks with the local Bike Users Group (BUG), bike racks have been provided on the property. Third, Kathy heard about Metro's High Occupancy Vehicle (HOV) lane study and actively lobbied to have HOV's designated for Bayview Avenue, in the longer term, to facilitate carpool and transit movements.

Marketing

With 4000 employees on three shifts in a dozen buildings, reaching people with carpooling messages became a challenge. A number of routes were chosen including construction of a per-

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manent information area in one of the main lobbies, articles in the employee newsletter, signs in the parking lots and at employee entrances, direct mailings, bulletin board promotions, and a phone hotline. Each new employee is given a carpool information package at orientation that explains the benefits. Kathy feels that the marketing effort has been successful, but recognizes that it must be ongoing to maintain long-term success.

The Future

Kathy has some good ideas for the future. The biggest and highest priority project is to integrate the carpool and parking databases and install electronic card access to the employee lots. This will improve lot utilization and billing procedures.

Other projects being considered for the future include: preferential parking for carpoolers; vanpooling; and carpool bus stops. (People without cars can stand at a carpool stop designated for, say, northbound, and a driver will pick them up and drive them part way, or all the way home. It is possible that permanent pools will be formed in this way.) Some financial incentives being considered are free parking for carpoolers, higher mileage compensation rates for multiple passenger business travel by car, and the possibility of group insurance rates as part of the employee compensation package for regular carpoolers.

Within the 4 km section of Bayview Ave. between York Mills Road and Eglinton Ave. there are eleven public institutions such as schools for the blind and deaf, Glendon College, and a chiropractic school totalling another 1000 employees. Sunnybrook is represented on a Neighbouring Institution Committee with these groups who have been supportive of the TMS approach. Kathy hopes eventually to include all these institutions in her carpooling database. Sunnybrook has illustrated what can be done with creativity, enthusiasm, and a strong commitment from senior management. There have been costs to the Centre in setting up the rideshare program, but given the options, e.g., construction of a new parking garage, the approach taken has been highly cost-effective.

Congratulations to Kathy and best of luck for the future. For more information contact Kathy Webster at (416) 480-6100, ext. 4532.

High Occupancy Vehicle Opportunities, Incentives, and Examples – A Handbook for Ontario Municipalities

The purpose of this new handbook is to provide transportation planners, engineers, elected officials, and other interested parties in Ontario municipalities with an outline of the types of HOV initiatives available, and of the situations in which HOV measures are likely to be most effective, especially for smaller and medium-sized cities.

Call (416) 235-3466 for a copy.

Ontario's Carpool Parking Lots

During the past 40 years, increases in housing costs, population growth, and an extensive highway network have made suburban living a way of life for more and more people. This change in lifestyle has increased the number of long distance commuters from the suburbs to jobs in the city.

Fuel costs and traffic congestion, coupled with a growing concern for the environment, give many commuters reasons to carpool and vanpool, saving on transportation costs and, in a small way, helping the environment. At present, approximately 20% of commuters are in some kind of ridesharing arrangement.

In recognition of this growing trend, the Ministry of Transportation of Ontario (MTO) opened its first six carpool parking lots in 1979. Since that time, MTO has steadily expanded its network: it now operates 55 lots with over 3800 spaces. To encourage use of the lots and to make them more convenient for the user, most are now paved, illuminated, have pay telephones, are snowplowed during the winter months, and are patrolled by the OPP. Eight of the lots located on major commuter routes have either GO Bus or Gray Coach service.

The majority of lots are located in Central Ontario, eight are in the Kingston area, two near Ottawa, and three located along Highway 17 in Northern Ontario.

The most recent survey, carried out in 1992, showed a 54% overall occupancy rate with eight lots having a 90% or greater occupancy rate.

As well as providing convenient parking for daytime commuters during the work week, the lots are well used during the weekends by people who carpool for shopping or recreational activities.

Ontario's carpool parking lots are paved, plowed in winter, well lit, have phone booths, and are patrolled by police. This typical lot at Hwys 401 & 10, had an average of 115 vehicles daily in 1992.

Sharing a Ride with Metro

The idea of moving people more efficiently is foremost in the minds of Metro Toronto planners. To this end, Metro is implementing a network of High-Occupancy Vehicle (HOV) lanes. The key to increasing the utilization and effectiveness of HOV lanes will require an increase in car and vanpools. However, the popularity of ridesharing is on the decline. People are accustomed to the luxury of driving alone, encouraged by low fuel prices and parking charges.

To reverse this trend, Metro engaged a consultant to develop a ridesharing strategy that would increase vehicle occupancy and support better utilization of HOV lanes. This ridesharing strategy was completed early in 1993. As a first step toward the overall strategy Metro is initiating a phased ridesharing demonstration which incorporates selected elements of three component strategies that make up the overall strategy: Rideshare Parking Lots Strategy; Employer/Metro Strategy; and Promotion and Information Strategy. These component strategies are outlined as follows:

Rideshare Parking Lot Strategy

Preferential parking has long been recognized as an inexpensive incentive for carpooling. This component of the overall strategy will establish preferential parking for rideshare vehicles at subway stations and GO Transit stations initially, followed by expansion to include rideshare parking lots around outlying areas of Metro, easily accessible to HOV lane networks. These designated carpool parking areas will encourage commuters to meet and form carpools to commute to work locations via HOV lanes.

Information displays at Travel Information Centres will publicize the locations of preferential parking, carpool parking lots, and HOV lanes. These centres will also explain the benefits of ridesharing, in contrast to problems associated with single-occupancy vehicle (SOV) usage. Displays will be located at subway stations, workplaces, and other strategic public areas.

Employer/Metro Strategy

This strategy is designed to create a link between Metro and the employer by developing a cooperative approach to promote ridesharing. The strategy has two components. First, the Employer Transportation Coordinator (ETC) program which will offer employers the opportunity to have staff trained, by Metro, in ridesharing issues and implementation methods. Trained ETCs would promote and coordinate ridesharing implementation in their workplaces.

The second component is the formation of a Metro Transportation Management Association. The goal of this association would be for Metro and local employers to cooperatively develop programs and policies that promote and encourage ridesharing and other alternatives to SOV use. The approaches would reflect both Metro and employer interests and the commitments of each to ridesharing. The approaches could include: parking strategies; transit use promotion and incentives; shuttle services; and carpool matching programs.

Promotion and Information Strategy

This strategy involves educating employers, employees, and the general public about the advantages of ridesharing, again contrasting the problems associated with SOV use. This strategy would include several elements, the first being expansion of the Travel Information Centres established under the Rideshare Parking Lot Strategy. The centres would provide a wider range of information, including environmental effects of transportation, and would be located in more locations.

The second element, the Alternative Travel Options Campaign, is designed to build awareness of transportation issues and problems associated with SOV use within the general public. This element depends upon high visibility and high profile through various media: billboards, radio ads, newspaper ads, discussions on radio and TV, and mass mailings.

The final element is the Training Program for ETCs. The ETCs will be trained using the information and promotional aspects developed in the Alternative Travel Options Campaign.

Ridesharing Demonstration

Metro is proposing a phased, coordinated ridesharing demonstration program implementing selected elements from each of the above strategies. Some elements can begin immediately, others can be added as results and experience warrant, and as funding becomes available.

The elements included in the demonstration are: Preferential Carpool Parking Lots; Travel Information Centres; Employer/Metro Coordination; ETC Training Program; and the Alternative Travel Options Campaign.

Finch, Kipling, and Wilson subway stations are to have preferential carpool parking lots, and if successful, five additional subway station parking lots have been identified for inclusion. Travel Information Centres are to be set up along with the preferential carpool parking lots. After an initial period in the stations, these portable centres will be moved to other Metro locations. To aid employers in the promotion of ridesharing, coordination and assistance to employers would be provided by a ridesharing coordinator from the Metro Transportation Department. The ETC training program is being deferred until Metro gains more experience working with employers on ridesharing Promotion of ridesharing will be provided through an advertising campaign, developed in conjunction with the HOV lanes marketing strategy. The advertising campaign will use radio and newspapers and will focus on the use of HOV lanes (diamond lanes).

Implementation of the demonstration program can begin immediately upon the approval of Metro council. Success will depend on cooperation of employers, employees, and government leadership. Ridesharing and HOV's may not solve Metro's transportation problems, but will alleviate some traffic congestion and reduce environmental pollution. For more information contact: Tom Mulligan at (416) 392-8329.

Mississauga Area-Wide Ridesharing Demonstration

In 1990, the Municipal Transportation Energy and Efficiency Advisory Committee (MTEEAC) recommended that a demonstration project on area-wide ridesharing be undertaken. Subsequently, a consulting firm was hired to develop a strategy to implement a demonstration project. As a result, the City of Mississauga is about to launch an area-wide employer-based ridesharing program.

The Diamond symbol has been adopted throughout North America to denote HOV lanes. Mississauga supplements the Diamond sign with a carpool designation sign attached to the sign post at eye level.

The first task undertaken by the consultant in the strategy development was to review the North American experience with ridesharing, to understand the factors for success and failure. The review also determined that the best approach was to begin with an employer-based program rather than a total community-based one.

Having determined this, the next task was to identify a community in Southern Ontario that would be suitable, based on criteria identified from the North American review. Sixteen locations were identified and assessed for suitable ridesharing characteristics. Each site required: a limited and defined geographical area; a large workforce with potential for rapid growth; the flexibility to initially concentrate on a few large employers and then expand to others; employees with long distance travel patterns; and finally, relatively limited transit service. These criteria pointed to two or three locations within Mississauga as being most suited for ridesharing programs. The remainder of the consultant's assignment was to develop an implementation strategy and produce a report.

The project is now moving into the implementation phase. The first step about to get under way will be a survey of the employers in two Mississauga industrial districts known as Meadowvale and Airport South/Airport Corporate, to determine interest in participating and to get commitments from the employers. The results of the survey will aid in selecting one of these areas and will identify several large employers willing to participate in a one-year pilot project. Thereafter the pilot will be expanded to include all employers in the district.

The project will take place over a two-year period during which close monitoring will be undertaken. At the end of the two years, it is intended that the project will become a model for other municipalities to follow.

For more information, or to get a copy of the report "Development of a Strategy for a Ridesharing Centre," IBI Group, March 1991, contact Craig Willis at (416) 235-5033.

SHARE-A-RIDE PUBLICATIONS LIST

The following publications have been designed to assist individuals and companies in starting and operating a successful ridesharing service. These publications are available free of charge from the Transportation Energy and Productivity Office, (416) 235-5037.

- Central Ontario Carpool Lot Locations
- Eastern Ontario Carpool Lot Locations
- Carpools - Implementation Handbook, A Guide for the Employer
- Vanpools - Implementation Handbook, A Guide for the Employer
- Vanpools - Implementation Handbook, A Guide for the Private Operator
- Share-A-Ride Rideshare Matching System, Software Description

PRIVATE RIDESHARING SERVICES

In Ontario, most if not all organized ridesharing services are run either by large employers or government agencies. As the interest in ridesharing increases, several private enterprises have begun operations that provide carpool matching services to the public. This service is not government sponsored. Each company requires a fee for its matching services.

The following companies are presently offering carpool matching services in the Greater Toronto Area.

Carpool Organizer Inc.
1-800-461-8967
Ontario Carpool Inc.
1-416-454-9080
Poolit
1-416-515-9000
Rideshare Canada Inc.
1-416-777-1210

For further information on these services please contact the companies directly.

Queen's Park Ridesharing Project

When Alice Cichocki started carpooling from her Brampton home to the Ministry of Transportation's Downsview offices, the benefits of ridesharing quickly became apparent. Alice estimates that she saves over $2000 per year in commuting costs. For Manuel Jimenez, who has carpooled from Burlington to Downsview for the past eight years, the social aspects of carpooling are as much a benefit as the savings in car maintenance and travel costs.

Along with Alice and Manuel, hundreds of other MTO employees have enjoyed the benefits of a carpool matching service since the late 1970s and continue to find good reasons to participate. Now, others have the opportunity to join, as the program has been expanded to include all 29 000 Government of Ontario employees working in Metro Toronto. Ontario Hydro and the Liquor Control Board of Ontario staff are also included in the program.

The public service environmental program, "Green Workplace," is taking on the responsibility of centralizing and promoting the Share-A-Ride Program because ridesharing is an environmentally friendly way to get to work.

The computer software, Share-A-Ride Rideshare Matching System (SARRMS), used to match interested carpoolers, was developed by the Ministry of Transportation and is described in detail in the spring 1991 issue of the Fuel$aver. Postal codes are used to identify home and work locations and match participants accordingly.

An advertising campaign, which included demonstrations, newsletter articles, and an innovative new poster printed on obsolete highway maps, helped launch the program last March.

Although the basic SARRMS program is used, a new feature was added to accommodate people driving to GO Train or TTC subway parking lots. This new feature will give carpoolers priority parking at some GO stations – a big plus at these crowded lots.

The largest concentration of government employees is in the Queen's Park area. There are many small offices spread out across Metro Toronto, but each office on its own could not support a viable ridesharing program. By centralizing the matching service, people can be matched with someone from their own office, or someone who works around the corner or on the next block In many cases people living in the same community and commuting solo to work can be matched with a potential carpool partner who works for a different ministry.

Currently over 700 people have joined Share-A-Ride and received up to 10 potential carpooling partners each. The success of Queen's Park rideshare program will hopefully spur other large employers to introduce ridesharing programs of their own.

For more information on this ridesharing program, contact David Sparling of the Green Workplace at (416) 327-2671

FOR YOUR INFORMATION:

Make a note of the following Trucksave Fleet Managers' Seminars:

- London - September 9, 1993
- Toronto (West) - September 30, 1993
- Timmins - October 14, 1993
- Brantford - October 20, 1993
- Ottawa - September 22, 1993
- North Bay - October 13, 1993
- Barrie - October 19, 1993
- Chatham - October 27, 1993

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ABS Demonstration

Block out Sept 14 or 15, 1993 on your calender to attend a demonstration on antilock and other aspects of braking.

It will be at the ministry's commercial vehicle test facility in Huron Park (45 km north of London).

This event will be a HANDS-ON Demonstration where you can DRIVE the test vehicles. For more information contact: David Ker at (416) 235-5032.

New MTEEAC Video

A new addition to the Summer Maintenance series: Roadside Drainage (Rural) Video, will be available in September 1993 from the Transportation Technology and Energy Branch.

To borrow a copy contact: Craig Willis at (416) 235-5033.

FUEL$AVER & MTEEAC NEWS

ation Transportation Technology and Energy Branch

Winter 1994

Ontario's Award of Excellence for Trucking Fleets - 1993 Winners

Ontario's Award of Excellence for Trucking Fleets recognizes outstanding achievement through improvements in fuel efficiency, safety, productivity, and environmental practices.

Entries are accepted from Canadian operators of for-hire and private fleets which carry freight, own or lease at least 15 power units, hold a CVOR, and have significant operations in Ontario. Major improvements must result from actions taken by the fleet's Ontario-based employees.

A five-member panel of judges, representing government and industry, reviewed the entries, interviewed the finalists, and selected the winners based on the improvements in the above categories. The judges were impressed by the degree of professionalism exhibited by the applicants and the advances made by the fleets.

GOLD
FOR-HIRE: Challenger Motor Freight Inc.
PRIVATE: Canadian Tire Corp. Ltd.

SILVER
FOR-HIRE: Mill Creek Motor Freight
PRIVATE: Canadian Liquid Air Ltd.

BRONZE
FOR-HIRE: Al's Cartage Ltd.
PRIVATE: Canada Starch Co. Ltd.

A new award was designed this year for a fleet with less than 15 power units. However, the judges decided not to give the new small fleet award this year since the low number of applications received did not permit a competition of high standards.

Awards were presented by the Hon. Gilles Pouillot, Minister of Transportation, on November 18, 1993 at the Ontario Trucking Association annual convention. Award trophies will be kept permanently by the winners. In addition to receiving the trophy, the winners also receive the privilege of using the Ontario Award of Excellence logo as a means of exhibiting this achievement.

Congratulations to this year's winners and good luck to the 1994 entrants.

Applications for the 1994 Awards will be available in April 1994.

For more information, contact David Ker at (416) 235-5032.

Dan Einwechter, Challenger Motor Freight, receives his trophy from the Hon. Gilles Poulliot, Minister of Transportation.

Matt Mucciacito, Canadian Tire Corporation, happily accepts his Gold trophy from the Minister.

Second MTO/Industry-Sponsored ABS Demo

Trucksave is, "Industry and Government Working Together," which is exactly what happened on September 14 and 15, 1993. Trucksave and the Vehicle Technology Office of the Transportation Technology and Energy Branch sponsored their second antilock braking system (ABS) demonstration at the ministry's test facility at Huron Park in Centralia. Although last year's ABS demo was meant to be a one-time event, the trucking industry requested another demonstration as they felt there would be many new attendees.

Once again, the event was a great success. More than 400 people attended, including fleet personnel, suppliers and, of course, Ministry of Transportation of Ontario (MTO) staff.

The program for each day was the same. It began with several short, interesting presentations. John Billing of the Vehicle Technology Office discussed ABS technology, Peter Roy of Canadian Liquid Air praised the success of ABS in his fleet, Constable Bob Wilson of the OPP emphasized the reality of trucking accidents caused by defective brakes, and Ron Gervais of Allied Signal/Bendix spoke about the advances of ABS since the 1970's.

Afterwards, MTO demonstrated Commercial Vehicle Safety Association (CVSA) Safety Check Inspections on a rig loaned by Cuddy Transportation of Strathroy. Later, the attendees visited a mini tradeshow set up in the Facility Hangar where suppliers exhibited many brake-related products

Next, the ministry's A-train test vehicle, driven by Norm Carlton, gave some impressive runs on the track to demonstrate the differences between trucks with normal brakes and those fitted with ABS.

MTO together with Allied Signal/International demonstrated the advantage of Anti-Slip Regulation System (ASR).

Test Vehicles on Site

Mack Tractor
Freightliner of Canada
Ford Straight Truck
International/Tandet with Krohnert Tanker
International/Allied Signal A-Train
Kenworth/Eaton Tractor
Western Star/MTO Tractor
Kenworth/Rockwell
Crewson Tractor
International/Tandet
Straight Truck
Ford Grand Marquis Car
International (ASR) with Trailer
International with Canadian Tire Trailer fitted with ABS

Industry Exhibitors

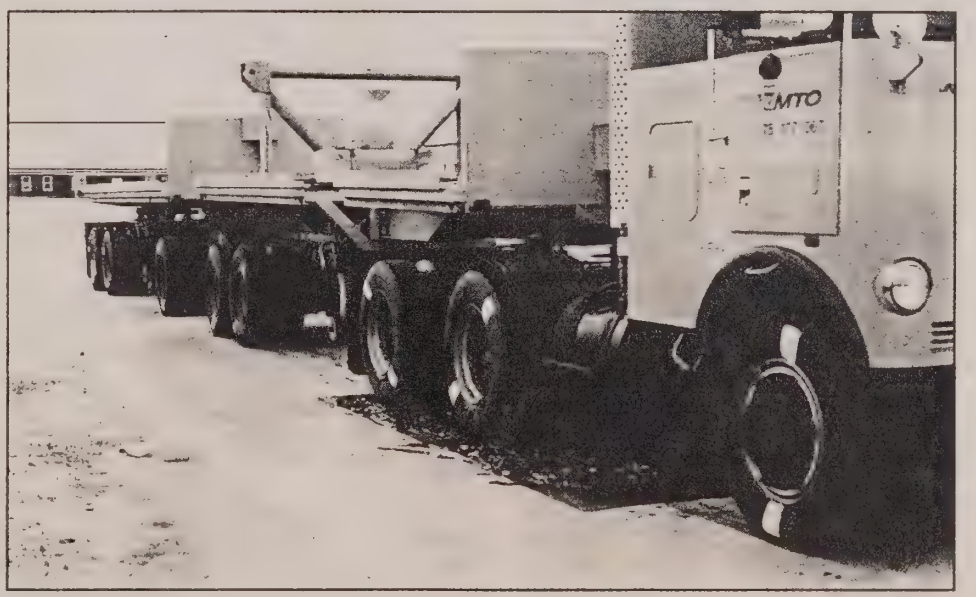
International-Carrier Truck Center Inc.
Freightliner of Canada
Ford-Parkway Sales
Gunite Corp.
Allied Signal/Bendix
Eaton Corp.
Kenworth/Pollock Rentals
Rockwell Wabco
Contrans
Midland Grau
SAE Winnipeg
Crewson-Brunner
Volvo/GM
Cuddy Transportation

ASR improves acceleration and straight-line running on slippery road surfaces.

After the ASR demos, the suppliers had a chance to parade their ABS-equipped vehicles.

Without a doubt the main event of the demo was the test driving. More than 300 interested people drove the vehicles or rode as passengers to experience personally the remarkably improved control of ABS trucks.

This excellent demonstration could not have taken place without the great support of suppliers and MTO staff. Thank you to all who organized and participated in the event.



MTO's A-train test vehicle sits ready to demonstrate the effectiveness of its Anti-Slip Regulation (ASR) system. The trailer brakes are locked on. The left drive wheel is on dry pavement while the right drive wheel sits on a polished metal surface covered with a soap film. The tractor pulled away with virtually no spinning of the right drive wheel.

How ABS Works in Vehicles

In an ABS-equipped truck, the brakes do not lock up. Each contains a microprocessor that, in effect, calculates the maximum amount of braking force that can be applied to each wheel before lock-up occurs. The truck can brake but will not lock up. Therefore the driver can control the direction of the truck during hard braking on slippery surfaces.

Trucks fitted with ABS have improved steering and stopping capabilities which, in turn, can prevent accidents. Jackknifing in particular is caused when the brakes lock up during hard braking, causing the tractor to skid violently and the wheels to slide uncontrollably. It becomes practically impossible to make evasive turns to avoid cars or others objects on the road. ABS helps prevent these regrettable accidents.

Due to budgetary constraints, the Fuel$aver & MTEEAC newsletters will be combined into one issue for the second time. Any comments regarding this new format can be sent to:

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A Second Look at Idling

In Spring 1992, Fuel$aver Volume 9, Issue 2, an article entitled, "Emissions and Idling Costs" was published. The costs of idling quoted in that article have generated much discussion. The following article is a follow-up and quotes, in part, from a technical session held at the Summer 1993 meeting of The Maintenance Council (TMC) of the American Trucking Association. The session was chaired by Robert Deierlein of Fleet Equipment Magazine who was the lead speaker at the session. Mr. Deierlein opened his speech by defining idling as, "any time a vehicle is stationary, but the engine remains running."

The first idling cost figures to be systematically collected were published in a 1986 study by the Argonne National Laboratory. In that study, Argonne researchers found that one hour of diesel engine idling caused engine wear equal to between 80 - 120 miles of actual driving, said Mr. Deierlein.

In September 1991, TMC's Engine Idling Limiting Devices Task Force issued its own report on idling. The Task Force report found that each hour of idling adds U.S. $2 to the maintenance costs of a turbocharged diesel engine, and U.S. $2.30 to the maintenance costs of a gasoline engine. The maintenance costs cited do not include the cost of fuel. The report, which ultimately resulted in the development of Advisory 11-2 "Idle Limiting Systems," has been hotly debated since its release, according to Mr. Deierlein.

A New Analysis Method

The second speaker of the session, Steve Heffner, Chief Engineer, Mack Trucks, noted that the cost of idling is highly application dependent. The main two ingredients that impact idling-related costs are engine idle speeds and engine loads.

Mr. Heffner currently serves as Chairperson of a Task Force on Idling Cost Analysis. The Task Force is developing an Advisory bulletin that fleets can use to analyse the total cost of idling equipment including not only fuel usage, but also the cost of excessive wear on engines and various parasitic components. Representatives from all four North American heavy-duty diesel manufacturers are helping to develop the Advisory based on their own products' operational parameters. Fuel cost is the primary cost associated with idling. Other secondary related costs include the cost of more frequent oil and filter changes, and decreased engine service life, i.e., more frequent overhauls.

Mr. Heffner expanded on these three costs.

Fuel Costs - Idle fuel consumption, an operational parameter that all fleets should measure, is dependent on both engine speed and engine load. It can range as much as 0.5 - 1.5 gallons (U.S.) of fuel consumed at idle per hour (1.9 - 5.7 L /hour). Idle fuel consumption can be measured and tracked automatically on many of today's electronically controlled engines.

Oil Change Costs - Just because an engine is idling doesn't mean its oil isn't degrading. Fleets with vehicles that experience a great deal of idling should shorten their oil change intervals. Shorter drain intervals are necessary for vehicles that idle excessively because idling-related contaminants accumulate sooner than otherwise anticipated.

Engine Wear Costs - Engine wear is proportional to the amount of fuel that an engine consumes. Each gallon of fuel burned represents an equal amount of engine wear incurred regardless of whether the engine is idling at standstill or is running on the highway at full throttle.

Based on these three parameters the Idling Costs Analysis Task Force is developing its idling cost analysis formula. Although not yet finalized, fleets will eventually be able to use the formula as part of their idling management policy. Fleets can put their policy into practice through various training and control methods, he said. As the Idling Limiting Devices Task Force determined in 1991, idle limiting devices can help reduce a fleet's overall idling time. The devices, which are available on electronically controlled engines and from independent suppliers, can be programmed to meet a fleet's special requirements.

(cont'd on page 4)

A Second Look...
(cont'd from page 3)

Another alternative is to minimize necessary idling. Auxiliary devices are now available that replace the function that idling provides - such as isolated battery systems that power cab "creature comforts." The new cost analysis formula will help fleets determine whether such auxiliary devices are cost-justifiable, said Heffner, the Mack Engineer.

Idling Reduction - One Fleet's Experience

The third and final speaker at the session, Rick Brandt, Traffic Manager, W & S of Wisconsin, said his fleet has been successful at minimizing idling time.

W & S of Wisconsin is a less-than-truckload, refrigerated carrier. It delivers goods from Wisconsin to the West Coast. In 1985, the fleet consisted of four tractors and six trailers. Today, it consists of 24 tractors and 36 trailers. In 1985, average fleet "engine life to overhaul" was 220,000 miles. Fuel consumption was an average 4.65 mp(U.S.)g. Following a visit to his fleet's engine supplier who instructed him that the expected service life-to-overhaul for his engines was 750,000 miles, he decided it was time to get serious about reducing idling-related engine wear and increasing fuel economy.

By 1986, idle time, road speed, and engine rpm's were at the top of W & S' hit list, as the fleet began a concerted effort to reduce operational costs and extend engine life. Mr. Brandt reasoned that if he could control his drivers' driving habits, he could control running costs more effectively.

W & S began experimenting with trip recorder systems - both for training and patrolling driver behaviour. The first reports gained from the system showed that W & S' tractors experienced 100 hours of idling for every 70 hours of road driving, meaning that 59% of engine use was idling. With the cooperation of their drivers, W & S determined that a driver could save $125 in fuel costs on a typical West Coast return trip if they drove no faster than 65 mph and kept idling to an absolute minimum. W & S began rewarding drivers for fuel savings based on trip recorder reports. Drivers are instructed not to idle their engines for warm-up or cool-down. Currently, idle time is down to only two percent, a figure Mr. Brandt is proud of.

Thanks to its idle reduction program, today W & S has:

- doubled its service life to overhaul
- extended driveline life
- doubled battery life
- tripled fuel injector life, and
- extended oil drain intervals from 15,000 to 30,000 miles

Mr. Brandt said the program may not work for every fleet, but it has resulted in big savings for W & S of Wisconsin.

Unnecessary idling robs the trucking industry of its profits, not to mention its adverse impact on air quality and the depletion of resources. The solution is simple: **stop idling.** However, implementing an anti-idling program is not simple. It requires the cooperation of management and the drivers. Once in place, the financial benefits can be easily realized and in the case of W & S, management passed some of the savings on to the drivers.

If your fleet has had a successful anti-idling program, we would like to hear about it. Please send any fleet information including dollar savings to the editor and we'll report them in an upcoming newsletter.

Shopping for a Safer Car - 1994 Models

If you're like most people shopping for a car these days, safety ranks high on your list of purchase considerations, right up there with quality. Automakers, in turn, are focusing more and more of their advertising on the safety features of their new cars.

The problem comes in sorting out the advertising claims and zeroing in on the features that really count. The most important safety considerations are those that help people stay alive and uninjured in crashes.

The first level of crash protection is provided by the modern car itself. Today, how a car performs in a crash is no longer an afterthought; it's part of the basic engineering design.

This evolution in crashworthiness has occurred because of growing consumer interest in safety as well as government regulations and crash testing. It was made possible by innovations such as advanced computer modelling, which allows manufacturers to predict, at the design stage, how different structures will perform in crashes, as well as by automakers' crash test programs.

Crashworthiness is what carmakers are referring to when they advertise features like, "crumple zones," "crush zones," and "safety cages." The idea is to provide crash protection by placing a rigid steel cage around the passenger compartment. Sections in the front and rear of the vehicle are designed to crumple in a collision, absorbing crash energy.

Every foreign and domestic automaker selling new cars in Canada must meet a range of standards not only to protect people in crashes but also to help drivers avoid crashes in the first place and to minimize fires after crashes. These standards don't call for specific designs but, instead, require minimum levels of safety performance.

Carmakers can choose different designs to meet safety standards and some are clearly superior. As well, some cars have features that aren't required but are either provided as standard equipment or as options. Three of the most significant safety features available are antilock braking systems (ABS), anti-slipping regulations (ASR), and air bags. While these are not required equipment today, they will eventually become standard. In the interim, new vehicle purchasers should give serious consideration to these items when buying a vehicle.

Twenty Years Later

October 19, 1973 is a date you probably don't remember. The events of that date shocked the world and their ramifications still influence us today. It was the start of a three-day meeting in Vienna at which the Organization of Petroleum Exporting Countries (OPEC) ministers voted to raise crude oil prices by 30%. At the same meeting, the Arab ministers decided to boycott shipments to the United States and several other western countries in retaliation for Israeli support in the early October Yom Kippur war. This was the first energy crisis that shocked the world, particularly the United States. While Canada did not have a shortfall, the United States did and the crisis has had a lasting effect on the automotive industry, the petroleum industry, and the cars we drive today in Canada.

The United States had been experiencing localized shortages of heating oil in the winter of 1972-73 and gasoline shortages in the summer of 1973. It was at this time that gasoline prices started rising and the first lineups for gasoline began to appear regularly. It was not until November 7, 1973 following the announcement of the embargo, that then-president Richard Nixon took strict measures and reduced speed limits to 55 mph. Canada followed suit in June 1976 by reducing speeds from 70 mph to 60 mph on freeways and 60 to 50 mph on two lane roads. In December 1973, OPEC voted to raise crude prices an additional 130% and the United States prepared for rationing. The embargo was lifted in March 1974 removing the need for rationing, but the damage had already been done. Most Western economies fell into a recession followed by double digit inflation, known as "stagflation."

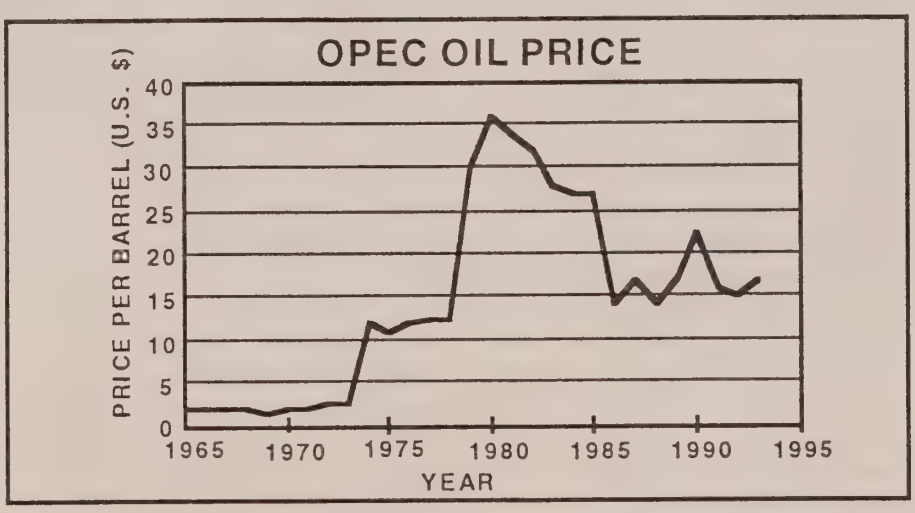
The carmakers scrambled to develop new and smaller product lines and to retool plants for this reduction. Unemployment in the auto industry jumped to high proportions. Chrysler Corporation introduced the first retail rebate when it found itself with a glut of unsold cars. Japan, which had small fuel-efficient cars on the market, was hit with both the embargo and a steel shortage and couldn't increase automotive manufacturing production. The first North American company to produce a domestic subcompact car was General Motors which brought the Chevette from concept to the market in just 21 months.

The most lasting impact of the crisis occurred when, in 1978, the United States introduced Corporate Average Fuel Economy (CAFE) rules calling for each manufacturers' fleet of passenger cars to average 20 mp(U.S.)g (11.8 L / 100 km) by 1980. Though Canada does not have mandatory standards, fuel consumption of vehicles sold in Canada has paralleled U.S. standards.

Many changes to automobiles have occurred since that day. Because the European and Japanese markets had always demanded fuel-efficient cars, European and Japanese manufacturers were ready to move into North America. The result was that the import market grew from 15% in 1973 to 34% today. But this didn't happen overnight. Around 1976, three years after the crisis, the trend switched back to larger cars. It wasn't until after the second crisis in 1979 that small cars became a permanent feature on the road. During the decade, the cost of one barrel of oil rose from U.S. $3 to U.S. $30, further ensuring that small cars were here to stay. The major changes in technology that occurred as part of downsizing were a swing away from V-8's to 4 and 6 cylinder cars, front wheel drive, electronic controls to improve fuel efficiency and reduce emissions, and substitution of steel and iron by light-weight plastics and aluminum. The average weight of plastic in cars grew from about 27 kg in 1970 to 110 kg today. A typical North American car is 450 kg lighter today than it was in 1975.

The memories of the embargoes still remain in the minds of North Americans, particularly in the United States. Today's CAFE standard is 27.5 mp(U.S.)g (8.6 L /100 km), and there have been calls in Congress for a CAFE standard of 40 mp(U.S.)g (5.8 L /100 km). This standard is being driven as much by the need for improved air quality in many U.S. cities as it is to ensure independance of supply.

The 1973 embargo only lasted six months; however, its effects have been so pervasive that President Clinton has just proposed a joint initiative with Chrysler, GM, and Ford to develop a "super car" to achieve 80 mp(U.S.)g (2.9 L/100 km) within a decade. It will be exciting to follow the development of the new technologies that will be necessary to reach this target. When it is realized, Canada will benefit with cleaner air, smaller gasoline bills, and a greatly enhanced security of supply.



Following quite stable prices of the 60s, the oil embargo of 20 years ago has created a turbulent era in crude oil prices. (U.S. $ Nominal)

Blame it on the Rain...The Roadside Drainage Video

Following the success of the Municipal Transportation Energy and Efficiency Advisory Committee's (MTEEAC) Municipal Summer Maintenance Videos, the Transportation Technology and Energy Branch of the Ministry of Transportation, in conjunction with MTEEAC, is pleased to announce the completion of another video in its Summer Roads Maintenance Series, called "*Roadside Drainage (Rural).*"

Directed towards municipalities, the 45-minute video discusses simply and clearly key issues concerning the maintenance and repair of safe and efficient roadside drainage systems. The video is divided into four segments, each discussing a different aspect regarding roadside drainage.

The first segment focuses on the basic theory behind drainage systems. It highlights municipal legislation applicable to drainage systems and construction safety measures as they apply to certain drainage activities.

The second segment examines various types of drainage system inspections, as well as drainage system maladies such as blockages and flow restrictions, cracking, heaving, settling, and erosion.

In the third segment, culvert installation, the video addresses the planning, preparation, replacement, and installation of culverts. It deals with issues before actual work can begin and discusses the effectiveness of culverts.

And in the fourth segment, ditch maintenance, the routine upkeep of ditches, major ditch cleaning, and erosion are examined.

To illuminate the various topics, the video presents several actual on-the-job operations: basic maintenance and repair of drainage systems; examples of erosion and erosion control; installation of a culvert; the effects of poor drainage on roads; and safety precautions undertaken by a maintenance crew.

It is hoped that through the use of this video, safe, efficient, and cost-effective roadside drainage systems' maintenance will become standard practice by Ontario municipalities.

For Your Information:

Make a note of the following Trucksave Fleet Managers' Seminars:

* Windsor - January 12, 1994
* Sarnia - January 13, 1994
* Barrie - January 26, 1994
* Bancroft - February 9, 1994
* Thorold - February 16, 1994
* Guelph - February 23, 1994
* Owen Sound - March 3, 1994
* Thunder Bay - March 10, 1994

Please note that dates are subject to change without notice. To confirm, please call (416) 235-5038.

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To order your copy of the Roadside Drainage (Rural) video, please contact MTEEAC at the Transportation Energy and Productivity Office (address this page) or call (416) 235-5037/ FAX (416) 235-4936.

This issue of Fuel$aver & MTEEAC News was produced by Noelle Lee.